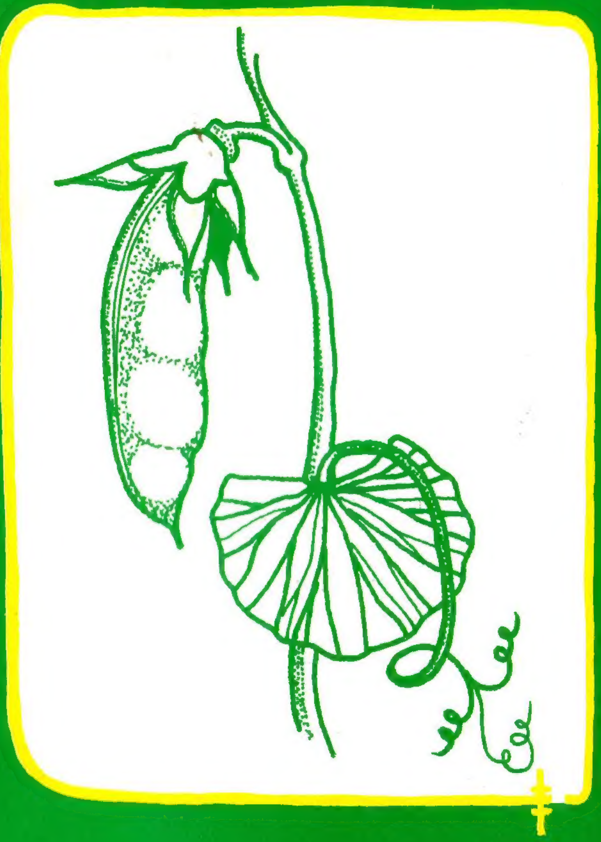
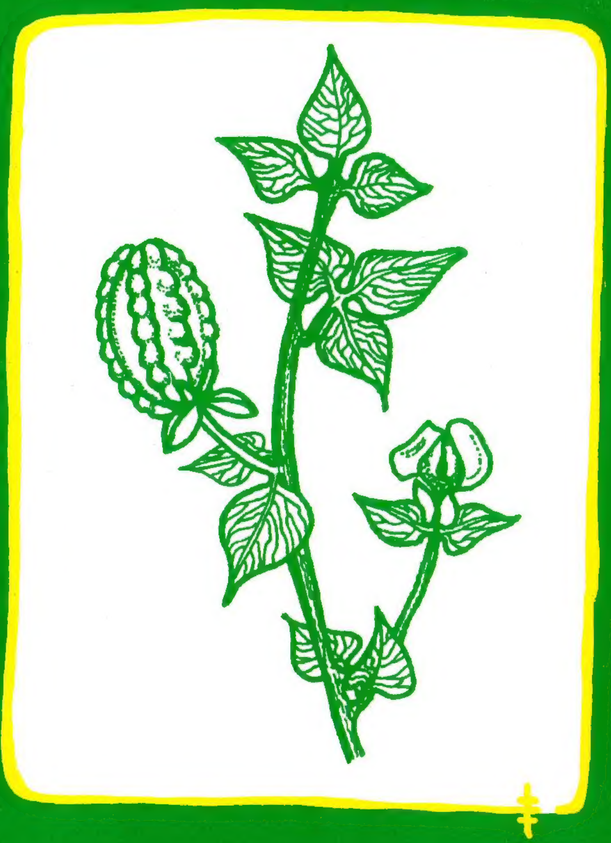
ISSN 0310-222X

EARTH GARDEN





Plants we eat!

Food resources: Plant protein — 16 legumes to grow and eat.
100 tropical food plants for Australia — part 1.

• EARTH GARDEN IS FULL OF BEANS (AND PEAS) • ADZUKI BEAN • PIGEON PEA • LABLAB BEAN • CHICK-PEA • WINGED BEAN • SUGAR PEA • TROPICALS • BREADFRUIT • COCONUT • COFFEE • CASSAVA • BLACKSMITHING • BLUESTONE BUILDING • LOW ENERGY MUDBRICK HOME • THE LIFE-RAFT • NATIVE TREE CROPS • BLACKFISH • HOME-BIRTH • NEW MEDIA • WOK COOKERY • CHOKO • LETTERS • ACCESS • LAND LINES • MORE!

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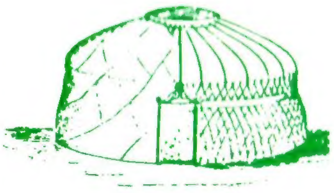
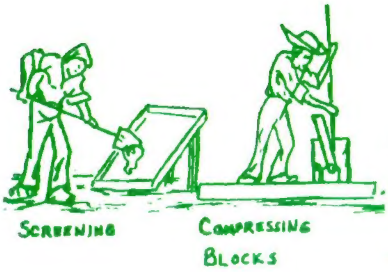
Australian ACCESS

the earth garden sourcebooks



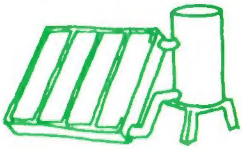
Australian Access is a guide to plans, books, groups, tools and techniques for the post-oil age in Australia, with ingenious human-scale methods for providing the essentials of life.

Its premise is that we Australians should live lightly on our island continent, without exploiting its natural resources. We can grow our own food, build our own homes and use small technology to provide life support, creature comforts, or to cut down on energy bills. All the sources are listed, with a key to tracking down specifics. Hundreds of instructive diagrams and illustrations.



ACCESS 1 (*Earth Garden* 22-3), 150 pages, $3.50 posted.

Subjects: Aborigines, organic food growing, permaculture, solar, wind, steam and water power, owner-building, earth housing and water supply. Includes: Top-end tucker, dilly bags, eco-farming, mineral fertilisers, biological controls, tree crops, keyline system, compost, appropriate technology, Savonius rotor, wind generators, pumps, hydraulic ram, water supply, build a concrete tank, solar cells, stills, water heaters, Coolgardie safe, earth blockpress, adzing.

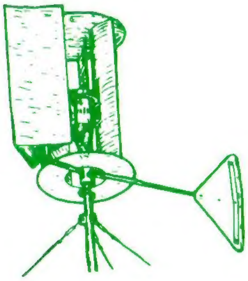


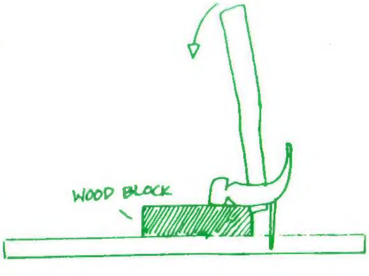
ACCESS 2 (*Earth Garden* 25), 130 pages, $3.50 posted.

Subjects: Fish farming, livestock, fencing, food and nutrition, methane gas, wind power, low energy solar homes. Includes: stocking farm dams, yabbies, fences, wombat gates, keeping sheep, pigs, goats, bees, ferrets; killing and tanning, food storage, provisioning a yacht, a year's food supply, vegetarian, vegan, fruitarian, interview with Dorothy Hall, grain grinders, mincers, Alexander technique, cheese, human wastes, Solarch house, low-energy home, passive solar heating, solar greenhouse, methane basics.

Earth Garden 25 is exceptional! The amount of energy put into the production simply astonishes me. — KEN KERN, author of The Owner-Built Home.

Whole Australian Access — the two volumes, 280 pages — $7.00 posted from Earth Garden, PO Box 378, Epping, NSW, 2121. Order form, page 62.





EARTH GARDEN 27

Earth Garden, established in 1972, presents a range of natural lifestyles. It is intended as a key to sources, practical ideas, alternatives and self-sufficiency.

It is concerned with non-polluted living and growing, the back-to-the-earth movement, surviving in the city, the bush, food and diet, and the inner changes which follow when you are in tune with nature.

Let us lead you up Earth Garden's path to the good life.

We don't have advertisements in Earth Garden. That way we're not influenced by any vested interests. Books, places and products recommended are those we think relevant.

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Cover

Front Cover: Snow or sugar pea (left) and winged bean (right), drawn by Elaine Norling.

Back Cover: Legumes from John Parkinson's *Paridisi in Sole Paridisus*, 1629 — 1. broad bean, 2. French bean, 3. garden pea, 4. Rose or Scottish pea 5. sugar pea, 6. spotted pea, 7. rams ciche (chick-pea).

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THE LIFE-RAFT

Robinson Crusoe steers his raft from the shipwreck.

It was after long searching that I found out the carpenter's chest, which was indeed a very useful prize to me, and much more valuable than a ship loading of gold would have been at that time.
DANIEL DEFOE, The Life and Adventures of Robinson Crusoe, 1719.

* * *

Heather Stone's article is easily the best among the entries in our "life-raft" competition. This is poetic justice, as it was Heather who suggested in EG 26 that a list of what is needed before starting a life of self-sufficiency in the Australian bush would be helpful.

It might seem a little like the British Broadcasting Corporation's "Desert Island Discs" in which competitors choose the records they'd like to take to a desert island, but we think this is a practical task. Everybody has to think hard before making the break from the city to the country.

The competition is still open and stories we use will receive $20. Feedback is welcome.

Defoe's shipwrecked sailor Robinson Crusoe, had the foresight to save everything he could, making 11 trips to shore in 13 days before the hulk disappeared after a storm.

As well as the carpenter's chest, he salvaged two saws, an axe, a hammer, nails, spikes, hatchets, a knife, pistols, powder, musket, bullets, biscuits, rum, tobacco and pipe, bread, rice, three Dutch cheeses, dried goat flesh, European corn, a hammock and a sail to make a tent. It was a good start for a life of enforced self-sufficiency on his desert island. We looked at the story more fully in Earth Garden 14.

BY HEATHER STONE

It is worthy of note that an Australian life-raft will vary widely. Much of my Tasmanian "stores and provisions" will be irrelevant to our tropical gardeners. Also people differ in their personal requirements.

With the rapid onset of "middle age" with its associated bad backs and various aches and pains and many years of unhealthy living behind us, we will be looking for items that will save labour and free us in part to achieve some of the "impossible" ideals that we have set ourselves as a small family unit. Our lists and formula tends to alter from day to day as we read, listen and have more ideas.

At the moment we are halfway through converting an old passenger bus into a mobile home. It is hardly "organic", being filled with labour-saving appliances, mainly second-hand, such as a three-way refrigerator, flush toilet and generator. It even contains a blackboard and laminated surfaces. At least when our house sells (if it ever does) we will be just as comfortable in a bush clearing as in a caravan park. We don't believe that deliberately planned discomfort will help us become good farmers.

When we move to Tassie on a tourist ticket, we will have paid for the bus in freight-saving alone and still have a self-contained low cost dwelling while we explore, buy our land, develop and build.

For cash income we are going to buy and repair an old Holden utility in which David will be able to ramble from farm to farm offering make-it and mend-it services for cash or barter. In the back, he'll have his tools, welding gear and, if necessary, a portable blacksmith's shop complete with forge and anvil.

To develop our land David would be able, for example, to offer a week's work operating earth-moving machinery in exchange for its use over a weekend. That way, dams, excavations, access roads and so on would be built with minimum financial outlay. We are lucky because David's innate skills with tools and machinery almost guarantees us some income. I have seen him quite literally make a bulldozer walk on water, weld champagne glasses from scrap metal, forge a ploughshare and turn a junk lawn-mower into a rotary hoe.

I will probably be the one to stay home to farm, so I am considering increasing our family from one to a dozen to grow our own commune. After all, age comes even to *Earth Gardeners.*

1. GETTING THERE

a) Books, books and more books. These are your most valuable tool. They will help you find an alternative solution for almost any problem... from technical manuals to the dream-time quality books of Neil Douglas, Abbie Heathcote and Alistair Knox (people I would dearly love to meet but never dare ask).

No book — even though they cost a fortune — is a waste of money at this stage. Several publications that have influenced me strongly spring to mind:

Earth Garden (the catalyst), *Grass Roots, Mother Earth News* (USA), *Practical Self-Sufficiency* (UK), *Getting Back Together,* Robert Hourier (USA), *How to Have a Green Thumb Without an Aching Back,* Ruth Stout (USA), *Organic Gardening in Australia* and *Organic Farming in Australia,* by Michael Roads, *Permaculture 1 & 2,* Bill Mollison (like a prophet returned to Earth), *How it Works,* vols 1 & 2, also P. A. Yeoman's *Keyline* books, Adelle Davis, Helen & Scott Nearing (USA), John & Sally Seymour (of course), Dorothy Hall, Ron Edwards and Ken Kern (USA) to name but a few. The list is endless.

Instead of newspapers buy the *Weekly Times* and the *Trading Post.* I don't know what we'll do in Tassie without the Trading Post!

b) *Debts:* Don't have any! Pay off all mortgages, hire purchase lay-bys and left-over debts before you leave. Try to have a year's supply of food and your essentials paid for.

If you retain anything like insurance policies or medical benefits, be sure you have a cash reserve to pay them. Even keeping one vehicle running means a large lump of currency to find each year.

The article, *A year's supply of food* in Access 2 (EG 25) lists a few of the unavoidable debts you may encounter. Unless you have perfect health, no children, enjoy an independent income and live in a large alternative community (like a feudal village) set in a lush tropical paradise, *total* self-sufficiency is a topic for daydreams.

Make sure you *own* your land, or at least have a secure cash income before you depend on it to supply most or any of your needs.

2. THE HOME

a) First you probably have to build it. Tools depend on your choice of building, but you will find use for hammers, multitides of nails, screws, hinges, glass, a concrete-mixer (optional), plumb bobs, straight edges and right angles, chisels, screwdrivers, chalk and pencils, geometry instruments, dry cement, Uniform Building Regulations (a must), corrugated iron, scrap timber and hardwood, plumbing, pipe-flaring tools... another endless list.

Go to your local library or craftsman to check out the tools necessary for each speciality. Simple items like trowels and saws can easily be overlooked. Anyone who can weld competently can make their own mudbrick press from scrap metal. Even a sunken 'live' house needs good drainage and an efficient disposal or recycling system.

b) Water: A pump is definitely required. This may range from a hand-pump, through *Billabong* hydraulic ram, diesel pump, tractor pump, closed system windmill, to an electric driven appliance. Whatever you use, it sure beats making twenty idyllic trips with a bucket to your creek, well or dam to boil the copper for the weekly wash — not to mention bathing, drinking, washing-up, vegies, trees and stock.

Given the right flow of water, we will opt for a home-made hydraulic ram.

c) Heating, cooking, lighting, cooling: Of course electricity solves all problems and creates more need for cash to pay for it. An open fire is great, but wastes fuel and energy.

A wood stove, a pot-belly stove, an old wood copper (gas coppers are easily converted), a chip heater all have their uses. But a combustion stove combines them all — perhaps a home made, multi-purpose one like the sketch in *Permaculture 1.* With a little imagination you will not only have superb cooking, warmth and hot water, but a food dryer, smoker, sauna, kiln, or chicken brooder. There my imagination runs out!

Insulation can be plain mudbrick, or double-glazed windows, shutters or foam.

Cooling. Those wanting a deep freeze will need either outside electricity or a large, expensive diesel generator. Otherwise you will require an LP gas or a kerosene refrigerator, a cool store, a cold cellar or a location close to a glacier.

A Coolgardie safe is better than nothing at all. Fine mesh wire netting is handy around food.

Unless you float a wick in your own tallow or olive oil, or you have a lot of bees, lighting is not a 'no-cost' item. You have a choice of fuel lamps of various kinds, gas lighting, carbide or battery lights, or your own electrical system (still requiring fuel or batteries to run or store it).

Perhaps *Earth Gardeners* can come up with more ideas for alternative lighting? We are going to rely on our generator supplemented by fuel lamps.

We think it is worth the effort both for your nerves and retention of desirable wildlife to make a decent effort to enclose and sound insulate your electric generator. A generating set will also charge your batteries and run small appliances in the kitchen and workshop. In a small family unit, this will help free you for some actual earth gardening. In a commune or community, it is more practically feasible for mixing and mincing, blending and grinding, drilling and welding to be done by the traditional methods.

d) Appliances, cooking, washing, clothing: The kitchen is the focal point of the home. You will need all the usual kitchen tools and ovenware. Enamel and plastic plates and mugs will not need replacing before you build a kiln. Cast iron and earthenware makes for better cooking.

If you plan to kill your meat you will need butchering tools and a large butcher's block. A big pressure cooker is indispensable and one of those collapsible steaming inserts that will fit in any pot is handy. You will never have enough containers, crocks, tubs and jars. A family bread bake requires a *large* mixing bowl. Trying to cheat one day I had rising dough covering the *floor* of my warming drawer.

You will need plenty of good sharp knives and a sharpening stone, hand beater, *Fowlers* preserving outfit (and hundreds of jars, tops and rings), big stockpot and preserving pan, meat grinder, flour grinder (eg *Little Ark)*, a kitchen sink (of course), cheesecloth, wax paper, parrafin wax, and a thousand-and-one items.

My own list is still pretty 'inorganic' due to bus living, where we will be in a transition stage. It's amazing how hard it is nowadays to find large, 'family size' pots, pans and cookware.

Clothing: Try to have a year's standby clothing unless you have the skills and time to fashion your own. Underwear, solid work clothes, gumboots (especially in Tassie), wet weather gear, jumpers, jeans, overalls and at least one set of 'going to meeting' clothes for when you need to impress the building inspector or any of his kith and kin.

The farmer's 'uniform' or khaki or jungle greens topped off by an old army greatcoat is probably your most practical item. Spend good money on boots. *Bare feet and adzing or barbed wire fencing just don't go together.* There are times when tight jeans can be distinctly disadvantageous, particularly when, like me, you are a tight fit in any jeans!

Have as many items as possible in 'wash-and-wear'. A treadle sewing machine, a few bolts of material, needles, pins, cotton, stout thread, buttons, spare zippers, safety pins and elastic will all be needed. Even string, bootlaces, and leather strips won't go astray. For the lazy or compulsive time savers, there are the iron-on hemming tapes and patches.

Those beautiful people who can 'do' (and I can't) will need fleece (on the hoof or otherwise) and a spinning wheel or loads of wool and a loom or knitting and crochet needles. Dummies like myself who can't follow a sewing pattern will need to dismantle their favourite old clothing and cut around the edges of each piece. Then it's just a matter of reassembling the jigsaw.

Washing and laundry: It's a sad fact of life for women or liberated males that these things don't look after themselves. The further you get off the concrete, the dirtier you get. A fully-clad swim in the creek every day is only a partial solution, particularly when the creek is muddy or it's 2°C. outside. Tub baths are a good interim measure for the worst of the sweat and manure, so of course, you need a tub. An old cast-iron bath is a handy acquisition. So is a wood copper (boils the clothes and bathes the children) and a chip heater or combustion stove. You will need tubs and troughs and plumbing, so before you go into a *zilch* income situation, collect as many pipes, taps, U-bends, faucets, washers, plumbing tape and copper coils (multi-purpose) as you can.

The one aspect I am absolutely dreading about 'dropping out' is the weekly wash. All other hardships I can face with equanimity. I have acquired a cream skimmer for pumping the wash up and down, an acme hand wringer and (sorry folks) an *extendaline.* But, if I can somehow engage David's sympathies (he's a true chauvinist), he might devise something along the lines of a giant cream churn operated by a bicycle or mule-driven treadmill.

Also needed will be a big stock of clothes pegs (the carved soldier type) and biodegradeable soap powder until you get into making your own soap. For the absolute minimum ironing I hope to do (I hate ironing), I have an old flat iron, but I am hoping the generator will provide the odd bit of power needed when planning a trip to town or pressing a child's uniform or clothes for school.

I was told in Ulverstone (Tasmania) that if I hung around the laundromat a while I'd be sure to meet some of the local 'hippies'. It's hardly soft technology, but with my feelings about washing and ironing, I can still find no words of censure. Incidentally, I was also told, in slightly shocked tones, that a lot of these 'hippies' come into town for Friday night shopping *still in their work clothes!* It was the second fact that struck the locals as incongruous. As my mother, imported from Victoria as a war bride, was still considered an outsider after 20 years, it is not surprising that the new settlers — though considered harmless and industrious — are still 'them'. Already tainted by my 12 years in exile, I will be slotted into an undefinable category when I return home and *join* the 'hippies'. At least OFGS is well-regarded locally.

I appear to have moved well away from washing, so we might look at linen. *Doonas* (down-filled quilts) or good sleeping bags can provide the warmth of many bulk blankets. Like tools, cheap ones defeat their purpose. Unbleached calico, rolls of towelling and your treadle will provide you with sheets, towels, tea towels, curtains, and even clothing. Make your own dyes. Use salt to help articles become colour-fast and never wash white underwear with red clothing or boil woollen socks too long in a copper. They turn to a jelly (which I never thought to test for insulating value).

Still in the home you want foam (or straw sacking) for mattresses and huge stocks of hardware (hinges, screws, nuts and bolts). Nets and a couple of hammocks are useful.

Drinking water should *not* be kept in clear or white plastic for more than a couple of days. Apparently it grows loads of beautiful fungi and algae. Old caravan hands use ABX black plastic containers.

If you are handy with a welder (or even a hacksaw) 44-gallon drums can be made to serve a myriad of purposes — from a combustion stove to header tanks or solar room heating (like Steve Baer's *Drumwall,* in *Earth Garden 20).*

Old tyres could be used for footwear, road building, swings, artificial reefs and miniature garden cloches. I would love to see more ingenious ways of recycling drums and tyres.

First aid: In alternative living, *prevention* is the major component. As we are not yet versed in herbal and natural medicine, we have compiled a list to cover everything from a tooth to a toe ache. We'll whittle it down as our health and our knowledge increases.

For those of us who are not living on a herb farm, or strongly into herbs yet, I would love to see an 'Alternative Australian First Aid Manual', incorporating, as well as *snake root* and little known herbs, uses for common household items such as bicarbonate of soda, etc.

hydrogen peroxide
iodine
stericaps
multi vitamins
Vits E, B, and C
rubbing alcohol
scalpel
tweezers
scissors
cotton wool
cotton buds
mirror
magnifying glass
thermometer
nail clippers
splints
razors
medicine glasses
medicine dropper
mosquito netting
styptic pencil
bunion and corn patches
mixed bandages
first aid manual
medical encyclopaedia
tinea ointment
oil of cloves
wheat germ
yeast
lecithin
dried herbs
garlic
comfrey ointment
bicarb soda
charcoal
ribena
blue bag
dexal
napthalene soap
tick anti-toxin
vaginal cream (minor infections)
dental floss
toothache drops
pair of pliers
insect repellant
incense
"Hard as Nails"
castor oil
cod liver oil
olive oil
koamagma
milk of magnesia
mints
analgesics
sunburn cream
anti-histamine
cough mixture
ammonia
ear and nose drops
eye lotion and drops
vaseline or petroleum jelly
Vicks
oil of eucalyptus
citronella (burns)
broad spectrum anti-venene
lice cream
Sloans liniment
Camphor rub
wintergreen
poultice

I vaguely recall as a child being rubbed with *Vick's* vapour rub, given eucalyptus oil on sugar for colds and brandy with hot water for menstrual pains. Now we use penecillin and analgesics. We have found that Dr Gregory's Rhubarb Powder (dried, ground rhubarb root) will relieve diarrohea in small doses and constipation in large ones. Taken regularly it will cure any colic-associated stomach problems, including stress-produced stomach 'migranes'.

The oil in the skin of an orange will relieve the pain of a burn and prevent blistering. We found this out when I grabbed the exhaust pipe of a bulldozer and had only an orange and a peanut butter sandwich at hand for relief!

A Citizens' Band (CB) radio is a useful product of technology when you're outside the towns and cities. Having spent several years on the organisational side of a National CB assistance group, I can personally vouch for the tremendous number of people who have received help through that medium. An interesting, though not typical, case occurred when Victorian volunteers called Darwin police and ambulance to a severe road accident in the Northern Territory. Such 'freak' transmissions are not uncommon during high sunspot activity.

For those who head more deeply into the bush (exploring your boundaries) or are still living nomadically, a rucksack crammed with these goodies could make the difference between hardship or survival in comfort.

Dried concentrates
compass and map
clasp knife
whistle
line, hooks, sinker
hand caster
needle and cotton
100ft nylon cord
matches/cig lighter
dry bait
puritabs (for water)
pencils and paper
aluminium foil
"space" blanket
dry clothing
miniature pellet-fuel
cooker
candles (2)

Strapped to the outside carry a water flask and walkie talkie (optional). If you never use it, you've no cause for complaint.

3. THE FARM

It's daunting to think of the amount of things to be brought from outside the home. Toni Mackenzie's *A Small Place in the Country* (Collins) would be a close equivalent to *The Fat of the Land* by John & Sally Seymour (Faber). As we are wholly converted to the *permaculture* ideal, our first 'tools' will be hundreds of trees.

To utilise these we will first require some:

a) Clearing: Tractors and dozers (rented or borrowed), machete, rake, hoe, chainsaw, slasher and fern hook.

b) Fencing: A number one priority, requiring the usual fencing tools — wire of your choice, wire strainers, spades and shovels, post-hole diggers, drill hammer, staples, saws, axes, creosote and coal-tar oil, etc.

If your fence consists of sagging barbed wire, at least have decent cyclone or wooden gates, otherwise you will soon come to hate them. Electric fencing is good for strip grazing but not necessarily trouble-free. There is always something occurring to break the circuit, or a stubborn old sow about to charge, squealing, straight through the wire.

Once the fences are in you can put in your trees, mulching with old hay. By the time the posts rot and the wire rusts, you should have an edible but impenetrable 'life' fence only requiring a judicious annual pruning.

Livestock need water and shelter, so you need plenty of old troughs and plumbing. A salt and mineral lick is necessary. Hay bales perform well as temporary shelters and once they have been eaten from the inside out, you can easily whip up another shelter in the next area on your rotation plan. Old corrugated iron and chicken wire are necessary supplements. Try to keep your fencing one step ahead of your animals, using your pigs to plough and fertilise each enclosure.

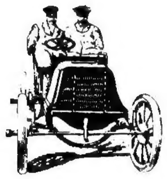
For the first couple of years you will probably need to both import and grow fodder. Eventually, your planned self-foraging permaculture system will emerge and you will have productive, contented stock for a comparatively small outlay of time and attention.

Even though I've written at length, I've still managed to leave out essentials like water tanks, butter churns, animal health requirements (Juliette de Baracli Levy's *Herbal Handbook for Farm and Stable* is essential for this). Then there are seeds, roots, cuttings, organic fertilizers, a septic tank (or equivalent), so I'll stop here.

To all *Earth Gardeners* who, like us, are waiting to become husbanders of the earth, we hope the waiting will be short-lived. We would love to hear from people (especially in Tasmania) who have been through the mangle and are surviving.

Love and peace, *Heather & David Stone,*
8 Banksia Street, Clayton, Victoria 3168.

Trucks & tools



By Keith Watson

First of all, be prepared to work hard and get some money. You are going to need a truck — a table-top, 30 cwt or a one-ton truck. Bedford 30 cwt jobs have trouble with the rear hubs. It's better if you can get one with a dual wheel back axle, or get some two ton or 2½ ton axle under them.

Dodges are excellent ... mine is a Dodge 2½ ton with a Morris Commercial 4½ ton axle under it. Don't get a four-wheel-drive (unless you get a bargain) because they cost too much.

The next thing is to learn how to look after your truck. This is to make use of the throwaway society — your scrounging won't be too much use with a car.

Get some place to store your junk and widen your circle of acquaintances. And don't be afraid to let the world know when you want anything. The bloke at the bar beside you may have it in his shed.

Get a picture in your mind of your set-up. You will want permanent water, so you need a good, reliable little pump. Eventually you might get a windmill, I suppose, but you will very likely need a petrol pump first off. Just think hard about it and tell everyone what you need.

You might even get a tractor if you talk a lot about it. I did, and a chisel plough. You can strain fence wire with a mini hoist as I do. I put the clamps from an old Donaldson wire strainer over the hooks on the hoist and strain it up.

Buy things like hammer heads, spades, garden forks, adzes and axes from local junk shops. Find out how to sharpen them and put in your own handles.

Never pass a dump without going into it and looking. It would break your heart if you picked up 30 or so sheets of good roofing iron and had nowhere to put it. You must have some place to store your junk.

The main point of the exercise is that it is not the number of tools, or the cost of the tools, it is knowing what to do with them when you get them in your mitts.

My best hammer cost 25 cents and I made the handle. I swapped an old guitar for my big adze. A fine old man gave me my broad axe head. My second adze was given to me — it had been used as a garden hoe. I learned to sharpen it and made the handle from a mangrove bough.

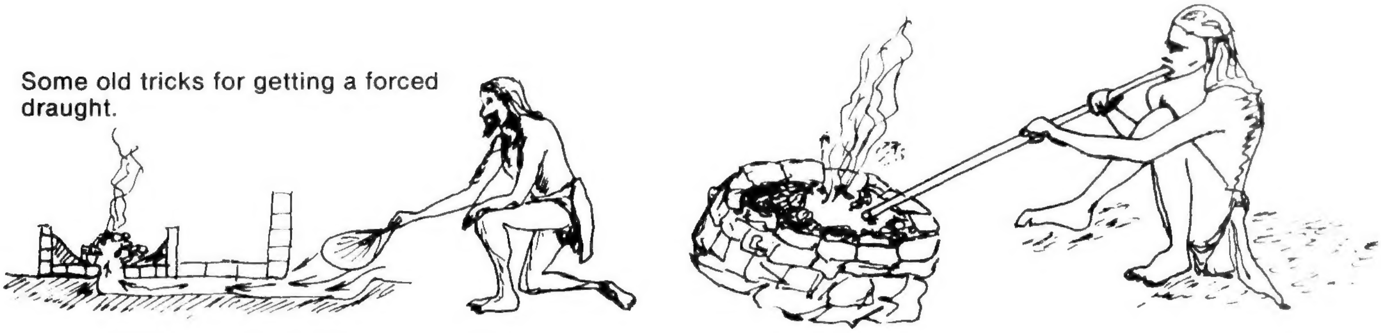
The main thing is to work hard for money, then spend the money to buy land. Go to junk shops for clothes, tools and old books. Practice with your tools until you know them. Put by about $5 or $10 a week in a credit union. This is your fighting fund; the money that buys your tools.

Modern society favours the pioneer, always providing the pioneer devotes himself wholeheartedly to making use of this modern society.

So, one day when you're old and grey, sitting by the fire in your own house, your pigs are home and the garden (and weeds) growing like hell and you can drink your own creek water, someone will come and ask: "How do you go about it, mate?"

And you'll say this and this and this. You'll **know**, my friend, because **you** will be the pioneer.

BLACKSMITHING



Some old tricks for getting a forced draught.

These boys did their smithing without the help of all the so-called modern necessities.

BY MARIO ZOLIN

Reprinted with permission from
Gone Bush

Much rubbish is talked and written about blacksmithing. Many of the books that are written would have you believe that, unless you are a combination of graduate metallurgist, industrial designer, saint and strong-man you have no hope at the craft.

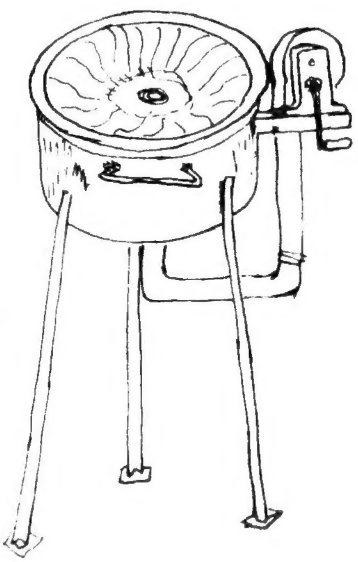
And yet, the working of iron is one of the oldest crafts practised by man. The smithing or iron relies on the simple fact that the metal, one of the strongest at normal temperatures, becomes quite soft and plastic when it is heated to a moderate temperature.

The method of achieving that temperature has, traditionally, been the burning of smokeless solid fuel (for comfort's sake) under some form of forced draught. The forced draught is not strictly necessary for simple shaping of the iron, it just makes the heating quicker.

There is one technique in blacksmithing which does require the higher temperatures available with forced draught burning. The forge welding process requires that the metal be brought close to its melting temperature so that two pieces of metal so heated can be forced to interpenetrate and form a permanent joint.

So, why bother studying blacksmithing? Mainly because, as in so many other fields, there seems little point in each and every person re-inventing the wheel. The techniques and happy accidents discovered by generations of practitioners need not be rediscovered (and definitely could not be) by every apprentice and self-taught craftsman. But to carry the analogy of the wheel further, there is little point in saying that no-one can use a wheel unless they can first make the hubs, bearings, spokes and tyres and that the tyres must be steel radials with white walls and no other.

Blacksmithing, as far as we are concerned here, consists of shaping iron "the black metal" at a sufficiently high temperataure by smithing (smiting — striking) and, occasionally, joining pieces of the metal by the same process. There are a few basic techniques which are worth looking at. Once these are mastered, we can look at the literature and get a few ideas from the masters.



The truck-wheel forge.

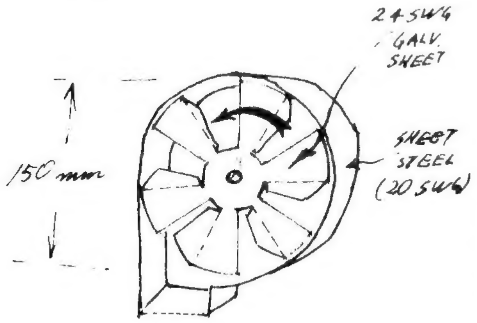
EQUIPMENT

Apart from the bit of iron you are going to smith, you will need something to smith with. The basic requirements are a place to generate some heat, a place to strike on and something to strike with. If you were crazy enough you could quite easily spend some thousands of dollars to provide yourself with the best of those four things. There is no need to. After all, the pre-Roman smiths didn't and some of their works are still hanging around. One of the great strengths of the blacksmith is that he can make many of his own tools. **But, be warned!** Beware of hardware stores, particularly the tool shelves. The temptation to buy just one more hammer can be too much. But then, what the hell! Throw the dog another biscuit.

Heating equipment

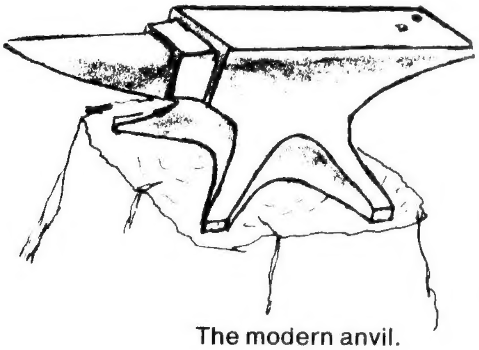
Traditionally, the iron is heated in a **forge**. There is no reason why you should not use an oxy-acetylene torch, a gas burner or a solar furnace for that matter — particularly if you are made of money. I use a forge made out of an old truck wheel lined with clay and blown either with a hand blower made from an old hand grindstone gearbox or, when I get lazy, an old vacuum cleaner.

The old-fashioned bellows are very romantic and look good in the traditionally set up shop, but what you want is something to move air about in a controllable quantity. The vacuum cleaner can give you much more air than you need, so some sort of control is needed. The simplest control is a butterfly valve in the air line. By the way, the place where the air leaves the air line and enters the fuel space is called the **Tuyere.** You have to know these things if you want to sound knowledgeable.



Some details of the home-made blower.

The fuel to be used in a forge probably gets more words devoted to its description than anything else in the smithy (the place where you smith). The various books will exhort you to use bituminous coal or coke or anthracite or the carbonised horn of the Bechuanaland Brindle Water Buffalo slaughtered according to ancient rites under a full moon at midday. I use the charcoal that's left over after our winter burning off fires. I find the charcoal from denser woods such as grey box and redgum lasts longer and does not powder as much. But anything which will glow red and burn seems to do.



The modern anvil.

Something to hit on.

Whether it is or not, the thing you hit on is called an **anvil.** Lots of things have been used as anvils — stones, lumps of metal, old car bits and even wooden stumps. The important thing is that the anvil should be able to take a fair blow without flying apart or chipping or moving off in another direction.

The modern anvil looks like the one shown here. It has a face, a horn, a bunch of edges, a square hole (the hardie hole) and a round one (the pritchet hole) plus feet and a heavy body. The anvils come in many sizes but for my money anything below about 40 kg is too small and anything above 100 kg is impossible to move.

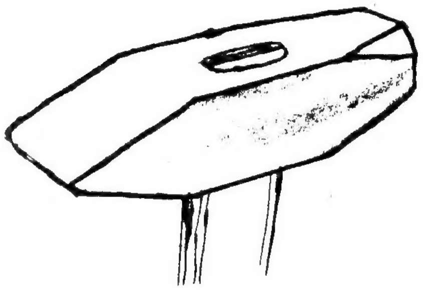
There is a lot to be said for the modern anvil. Two thousand odd years of development have certainly not been wasted. It seems, somehow, to have just the right shapes for just about anything you can make. If you are going to be working many hours at the anvil, it should be at a comfortable height. The traditional position is that the top of the anvil (the face) should be knuckle high to the smith. I find this a little low, but that may have something to do with my Darwinian stance. (Yes, I also have a hairy chest, but my chin recedes rather than protruding.)

Correct anvil height for the average smith.

If you are going to do fine work you will need a good clean face on the anvil but you'll be surprised what good work can be done even on an old beat-up piece of antiquity.

Something to hit with

The traditional all-purpose smith's hammer (the one that goes with the sickle on the red flag) is the cross peen hammer like this one. I have always wanted one but never seem to have gotten around to getting one. When I get around to breaking the handle on my present brickie's 2½ lb (1 kg) square faced hammer, I'll belt out one end. That seems to be the hammer I use most, though I have a fair selection of ball peen (engineer's) hammers and a 2 kg singlejack.



Cross-peen hammer.

One point is worth mentioning, if you buy or use any old hammer, grind off the sharp edges to a smooth, round fillet. It saves a lot of marking of the work and time spent in smoothing out mishits.

TECHNIQUES

The hotter the iron, the easier it is to work — up to a certain point. After you reach bright yellow heat, most irons and steels will start to melt and burn. You'll know when this is happening because the iron gives off showers of sparks like the old fireworks. This may be a necessary condition for some welding but it is generally undesirable. At the other end of the temperature scale, unless you are doing some hammer tempering or work hardening — and you'd better know what you are about before you attempt this — striking "blue iron" is a no-no. You bugger the anvil, the hammer and the work plus your chance of ever going to heaven.

The references given at the end of this article are full of good data on temperatures for different types of specialised work.

Shaping

The best thing you can do is get a piece of steel, heat it up and belt the bejabbers out of it. It's a good learning technique. It helps if you study a book or two like our references. Just remember that it is easier to make a thick bit thin than vice versa, although the vice-versa is possible.

Welding

I was put off trying welding for years by all the rigmarole that is written about it. Then I tried it and it's easy. The secret is to get the metal quite hot and use a flux to cut the oxidation or scale. As in any metal joining technique you have to be **clean.** The flux I use is borax. If you don't know a supplier, you can get it from the chemist shop. I heat the metal to the welding temperature — a good yellow heat

— sprinkle on a bit of borax and quickly reheat. Take the metal out of the forge quickly and belt it as hard as you dare without ruining the work. It'll stick.

Metal

It's nice if you can get hold of some old wrought iron but I use ordinary structural mild steel of the common or garden variety. It does all I want it to — including weld — regardless of what the books say.

So what?

Why blacksmith? It's a fantastic turn on. I've been a gold and silversmith for years. Gold of 18 kt or better is undoubtedly the best art metal you could ever get, but at $400 the fine oz (this was in January, 1980) it is somewhat of a "sometime thing". Silver is good and you can get some beautiful work from it but you havent lived until you get a lump of iron, heat it up to a good heat and play it like plasticine, dunk it in water and end up with a strong, good looking tool. Even for art work, iron has a quality all of its own. I'd put it just below gold for the pleasure it gives in working it. As a bonus, it costs fractions of a cent per ounce and so you can use lots of it.

Art forms in iron

Over nearly 3000 years of use, certain forms have become obvious as ones that are both pleasing and practical for the blacksmith. Sweeping bends, scrolls and tapers look and perform well.

References: Jack Andrews, **Edge of the Anvil**, Rodale Press Inc, Alex W. Bealer, **The Art of Blacksmithing**, Funk & Wagnalls (N.Y.).

Edge of the Anvil

a resource book for the blacksmith.

Written and illustrated by Jack Andrews, Rodale Press, Emmaus, Pennsylvania 1977, 210 pages, paperback $9.50, cloth $14.95.

Jack Andrews approaches blacksmithing as a small-scale, intermediate technology and as an artist and designer in metal. He outlines the tools and techniques and shows how to make items like nails, spoons, candle-holders and fire implements.

He also includes his recipe for "blacksmith's beer" and a 50 page photographic portfolio of ornamental ironwork by Samuel Yellin of Philadelphia.

Our copy from A.N.Z. Book Co.

Land Lines is a free service for ***Earth Garden*** *readers, who must give their full name and address as proof of their sincerity. They also have the responsibility to thoroughly check all deals.*

Please keep listings to 50 words, plus name and address.

For sale: two bedroom house, on one acre, 16 km from Mudgee and Gulgong, NSW. Electricity and phone connected, septic and 4000 gals. of water. School bus at front door. Price $20,500.

Barbara J. Brown, Lot 8, Henry Lawson Drive, Home Rule, NSW, 2850.

Cash sale of a sixth share in established community, northern NSW, 20 km from Murwillumbah, bordering State Forest on three sides; tree ferns, stags, palms (death adders, leeches, midges). No tourists please. $7500.

Write: Tony Page, "Gumboot Gully", C/- PO Uki, NSW, 2484 or phone Dyan on (066) 79 5217, or (066) 72 3583 (bus. hours).

On Bellinger River, ⅓ share in 40 acres, for sale. It's ¾ hour from Bellingen. Ideal goats, fruit trees. Large alternative community, $12,000. Coffs Harbour 25 miles.

Ed Sanders, 66 McClean Street, Blacktown, NSW, 2148.

land lines

Providence Cottage, plus 6½ acres is now for sale. The land is well fenced, with vegetable gardens, a young orchard, large dam, stock shed and chicken pens. The four-year-old, 8 square weatherboard cottage has one bedroom, living room, kitchen, bathroom and laundry. There is a slow combustion stove, hot water, pot-belly stoves, electricity, septic tank and rainwater tanks. Situated two miles from Uralla and 15 miles from Armidale on the New England Tablelands. We are asking $29,500.

Derek and Elizabeth Skingle, Balala Road, Uralla, NSW, 2358.

We require land in the near future to provide us with absolute peace and privacy — within three hours of Brisbane and up to 50 km from the coast. Some good soil essential for planting fruit, nut trees and vegies, otherwise natural bush or trees required, preferably some rainforest. Permanent water is essential, either river, large creek or lake, or really good dams with springs.

We need a level area with views for building our "dream" house, or undulating country, facing north or north-east. Buildings not required, though an old cabin or shed could be of use whilst we build ourselves. Cash immediately available.

Write to Pam and Ron Elgar, 41 Wirra Wirra Street, Toowoomba, Qld, 4350, or phone: (076) 32 9860.

We have 30 acres of bush, 29 km north of Mudgee for sale. It is naturally terraced, with many good building sites with beautiful views and impressive boulders. There is some building material on site, including three water tanks and some windows. We plan to go overseas later in the year, so this is the reason for our selling. Price: $8500, o.n.o.

Rob and Debbie Forsberg, 7 Fox Place, Lyneham, ACT, 2602. Phone: (062) 47 8229.

Our mountain is clothed in a National Park. A peaceful energy radiates everywhere. We will enhance this energy with the power of our minds and the labour of our hands, to benefit the whole of life. There is room here for a few dedicated pioneers who seek the oneness of life.

Write: Templin Organics, PO Box 39, Boonah, Qld, 4310. Phone: (075) 63 1320.

Wanted: People to oppose woodchipping and form a reafforestation cooperative in coastal NSW-Victoria border area. Several properties available, including boat access to sea and lakes. Mild climate. Isolated, but schooling available. Sandy beaches, bush and wildlife. About 10 people with $5000 each are needed. Natural history, gardening and folk music are current interests.

Dusty Wolfe, PO Box 431, Eden, NSW, 2551.

Dear Earth Garden People — If anyone is interested in gaining the lease of ½-acre of land in New Zealand at $30.00 per year, plus ownership of a solid ex-Railway house, two bedrooms, black coal range used for heating water and cooking, part furnished, we have one for sale for $4000. House is on the Hurunui River, 60 miles north of Christchurch.

For more details, please write to Chris & Heather Grove, C/- 6 Ellard Avenue, Belmont, Perth, Western Australia, 6104.

We have a modern three bedroom house on five partly cleared acres near Smythesdale, 17km from Ballarat, Victoria. We mainly want to sell because our employment is in Melbourne. It is opposite a State Forest, has a garage, tool shed, water tanks, some fruit trees, no electricity. House is fully carpeted, has LP gas and stove, refrigerator and hot water. Price $31,000.

Please write Don Marks, 10/54 Alexandra Street, Balaclava, Victoria, 3183. Phone: (03) 697 5836.

For sale or shares. I have 80 acres of bushland near the Ocean at Lavers Hills, 140 miles south-west of Melbourne. About five acres is cleared and ploughed and there is a good sized hut on the land. Price $16,000 for outright sale, or eight $2000 shares (including my own ⅛th share.)

Bob Maxwell, 26 Bank Street, Brunswick, Victoria, 3056. Phone: (03) 380 5595.

25 acres for sale: we live at Pokolbin, Hunter Valley and we are building an adobe house and aiming for self-sufficiency. The land next door to us has just been put on the market and we would love to see like-minded Earth Gardeners buy it. It has a small dam and the creek runs through the back corner of the land, which backs on to a vineyard. Owner is asking $14,000-$15,000, but may accept less. His name is Mr Strbik and you can contact him on (02) 85 4112, or call us at (02) 6 2740-93 — Jenny & Greg Sheedy.

We are a couple in our mid-twenties who are looking for like-minded folk to enter co-operatively into our property. The land comprises 100 ha (240 acres) of mainly bush wilderness in the Lakes Entrance area of East Gippsland, Victoria. We are vegetarians, see no place for domestic animals in the bush, and dearly wish to develop a wholesome physical lifestyle combined with time for growth and spiritual awareness.

A half-share in the property would be $14,000 negotiable (including tractor and equipment) and we could offer terms. There is another 100 acres adjoining which is for sale. If more people are interested and all harmonise, maybe something larger could develop.

Please write to us if this idea touches you. Phil and Jaye Rickards, PO Keilor, Victoria, 3036.

I am seeking someone for nominal (or barterable) rent to live in my home and look after my dog for three months from August 16. I live 18 miles from Lismore on 63 acres. My house is small, with three bedrooms, but has electricity and phone. It's a very quiet, peaceful area.

Contact Marjorie Lobban, C/- Channon Post Office, NSW, 2480. Phone: (066) 89 1277 at night.

Nature lover's paradise: two-storey Besser block house, plus guest house (10 x 10m & 7 x 3.5m), established fruit trees and vege garden on hillside in virgin rainforest, with breathtaking scenery and absolute privacy. Part of 240-acre valley property on North Beatrice River, 10 miles from Millaa Millaa on Atherton Tableland, north Queensland. Price $25,000 ono.

Apply in writing to: H. Skinner, 28 Buckley Street, Yorkeys Knob, Queensland, 4871.

For sale: half share (tenancy in common agreement) of 40 acres at St Albans, NSW. The land is mostly timbered with some flat cleared land. It is isolated with beautiful valley views. A clean, sandy creek runs through the property.

Enquiries: E. White, Box 36, Tea Gardens, NSW, 2324.

We are a family of four living in the country who are looking to buy land with other people, or buy into an existing co-op. Our isolated self-sufficient lifestyle is very satisfying except for the lack of inter-action with like minds, plus our children's growing need for playmates.

We are basically vegetarians and not particularly interested in organised religions. We would love to hear from people seeking similar goals.

Bruce & Jean Fell, RMB 2101, Barham, NSW, 2739.

Town amenities, country setting in north-west NSW. Electricity, water laid on, phone available, septic, Primary and High School bus at door. About 12 acres in five separate deeds, three bedroom home, eat-in kitchen, lounge, full width verandah, sunroom, slow combustion and electric stoves, two hot water systems, lock-up steel shed and double carport. Price $30,000.

N. Morris, 8 Goomong Road, Kadanga, Qld, 4570. Phone: (071) 84 3331.

For sale: 167 acres (slopes) with approved building site and subdivision potential in village on sealed road. Views over Manning Valley. Primary School, shop, PO and railway station. Bus to High School. Land is third cleared, 5 dams (1x150,000 gal), 35 km to Taree, NSW. Price: $28,000 o.n.o.

Also, to let, small furnished house, same area. Modern facilities.

Write to Bronwyn and Joe Smith, Mt George, NSW, 2424.

For sale: 1/16th part ownership in a 410 acre tenancy-in-common property located at St Marys in Tasmania. A beautiful mountain with an old dairy farm, overlooking a 180° panoramic view of the Tasman Sea. Tolkein rainforest in the warm north-east region of the island, sunny aspects, bounded on three sides by State Reserve Forest, 1½ miles from the main Coastal Highway. Four bedroom community farm house, plus three sheds. Undeveloped community land with a number of private dwellings. Price $3000, no reduction. We are only interested in serious buyers.

Contact: Aaron and Vishka Zarebski, 46 Phillips Road, Mundaring, Western Australia, 6072.

Harmony Farm has four acres of organic fertility — growing mostly fruit trees. Anyone wanting some practical experience in permaculture can contact me (phone: 93 7205) or write. Vegetarian, non-smokers can stay here in return for help in the orchard, etc.

Mrs Marjorie Spear, Box 112, Kuranda, Qld, 4872.

Dear folks — We would like to make contact with Tasmanians who are selliing land or wanting to share it. We are open to suggestions, but so far have been considering mainly coastal land in the north-east, Tasman Peninsula, or Huon Channel, suitable for growing pip and stone fruits and with at least a small cleared area.

We'd be especially happy to meet up with others interested in Buddhist meditation. We'll be back in Tasmania in August. Meanwhile, our contact address is C/- Mt Nicholas Station, Queenstown, New Zealand.

Best wishes, Jenny Taylor and Stuart Cameron.

We would like to sell approximately half our farm, preferably to someone interested in running sheep and co-operating on a work-sharing basis. We would be selling 400 acres for $22,000. The country is mostly cleared with some natural bush covered hills. There is about 60 acres of flat, arable country and the rest is good grazing. A permanent creek runs through the property. Power is available and we are six miles from Grenfell, which has all amenities and schooling.

Eddie and Roslyn Hayes, Bald Hills Road, Grenfell, NSW, 2810.

I have $5000 cash and would like to purchase some land, from 5 to 10 acres, in north-east or east Victoria. The land would need to have a river or large stream, but no services (power, etc), lots of trees and bush, nicely secluded and situated well above any nearby towns.

Hoping you can help me, Michael Reid, 2 Addicott Street, Frankston, Victoria, 3199.

New media

Gone Bush

A Periodical on rural lifestyles and technology, bi-monthly, about 60 foolscap pages, crisply roneoed, $2.00 per copy posted from PO Box 31, Swifts Creek, Victoria 3896. (Annual subscription $12.00).

There has been a blossoming of small-scale, self-published periodicals in Earth Garden's field over the past year.

The word "periodical" is used advisedly here because Gone Bush, the most notable of these, denies it is a magazine at all. This non-glossy, non-magazine is designed, set up, printed and published by the multi-talented Lesley and Mario Zolin at their bush homestead at Swifts Creek, Victoria.

So far there have been five issues of this "collection of articles and information on energy alternatives, food, homesteading, building techniques and approaches to going about things" containing *practical* advice for people who have "gone bush".

Mario and Lesley Zolin have a particular talent for taking the jargon and mystery out of technical tasks like power generation and moving water, building a fence or a bush timber shed, shooting a rabbit or cooking it. *Blacksmithing,* by Mario reprinted in this issue of Earth Garden (page 9), is a good example chosen from many stories which are useful for what the editors call a homesteader.

These pieces are interspersed with some wry humour and opiniated insults and side-swipes at other publications and people of the "everybody-else-is-a-ratbag" type which the Zolins have every right to express — it is their periodical. When it ceases to be a new toy *Gone Bush* will benefit from some editorial tightening-up. In any case it is essential reading.

Kuranda Village News

Monthly, tabloid, 22 pages, $6.50 yearly posted from PO Box 62, Kuranda, North Queensland, 4872.

Peter Hohermuth, the editor of this one-man quality publication has adopted *"We prints what we likes"* as its motto. Peter publishes the paper, does the typesetting and layout and takes the photos — he is also *The Great Big Picture Co* and was a professional photographer in Switzerland.

This is more a village or local periodical. The interest lies in the fact that the "locals" are new settlers in the Cairns, Kuranda and Julatten areas. So, though the focus is on local issues, personalities and places, you get stories on tropical fruit growers like Rick Trapnell of Rosebud Farm or Margaret Fraser and her herb garden. We likes what Peter prints.

Maggie's Farm

Monthly, tabloid, 24 pages, $8.00 yearly ($4.00 for six months, libraries $12.00), posted from PO Box 29, Bellingen, NSW 2454. Editors Robyn Meehan and Pip Wilson.

Maggie's Farm is a bright, newsy voice of the northern New South Wales new settlers, based in Bellingen and reaching out to take in the Lismore, Nimbin and Armidale areas. They layout is funky and reminiscent of the lamented **Bush Telegraph.**

It contains regional news, satire, reviews and observation of short-comings and contradictions in the new ways of living. Articles in the first eight issues have covered Terania Creek, hamlet housing, collecting seeds, nutrition, Ken Yeomans on the Keyline system, natural dyeing, the dole, conservation.

There are two very good continuing series on "how-to" information — the monthly "Almanac", with planting, growing and cookery recipes and hints on keeping livestock and "a roof over your head", on owner-building, with illustrations.

"We're striving for a quality that is part of life," the editors said in the first issue. That still seems true in the most recent numbers. There is room for more "alternative" publications in Australia and Maggie's Farm is ready for a wider readership.

The Crow

Dropouts Quarterly

Quarterly, crisply roneoed, about 40 pages, illustrated, $1.50 per issue posted or $10.00 for the set of 8 (issue 1 may be unavailable now), from Lowoyoho, via PO Beaudesert, Queensland 4285.

The Crow is very much the creation of Tony Wedd who is now taking a "curtain call" from its production. Tony has painful cancer and the cure for it is not sitting indoors typing, designing, writing and reading — "If I don't knock off for a while and see to the needs of my body, I am likely to die", Tony says.

We are very proud to own a full set of eight Crows which, since the first took flight in July 1978, have swooped into strange places reporting back on the world's ills and offering New Age suggestions for their cure, on hypnosis, Uri Geller, pedal power, greenies, education, sex, astrological birth control, eco-hostels and Wenceslas boots. We hope the Crow will be a Phoenix yet.

25 POEMS

by Tony Wedd, 19 pages, $2.30 posted from the same address.

A slim volume of Tony's poems and graphics, written to go with an exhibition of his paintings. Rhythmic, wry, endearing verse.

1979 Learning Exchange Bound Edition

All 12 issues of the Monthly magazine in a tabloid-sized format, 284 pages, illustrated, $5.00 plus postage — 95c Melbourne metropolitan area, $1.25 Victoria, $2.25 for Sydney, Adelaide, Canberra, $2.50 for NSW and Tasmania and $3.10 for Queensland, NT and Western Australia.

While its emphasis is on Melbourne and Victorian community information, Learning Exchange has a diversity of articles on subjects like arts, media, alternative energy, health, transport (very good on bicycling and bike upkeep), conservation, music. Good value.

Address: Learning Exchange,
432 Waverley Road, East Malvern,
Victoria 3145.

Stone upon stone

BUILDING WITH BLUESTONE QUARRY RUBBLE.

BY STEVE LEE

Stone masonry is addictive. And to the addicted, laying one stone upon another — to create order from chaos — is pure pleasure.

It tears at the hands, strains the back and muscles and tires me to a standstill at the end of the day. But come next morning, I am back on the job with as much enthusiasm as ever!

Mosaic stone rubble in Earth Garden 9 (pages 8-12) started me and I went on to read and know the writings of the Nearings, Schwenkes and Ken Kern, among others *(see references).* All are essential reading for the would-be stone builder. *The Owner-Builders Guide to Stone Masonry,* by Ken Kern (with Steve Majers and Lou Penfield) gives an excellent description of both laid and formed stone building techniques.

After reading all the material I could lay my hands on, I began to plan a stone barn, big enough to cope with our interests in wood, clay, wool and glass crafts, and in a style that would complement our early Victorian house.

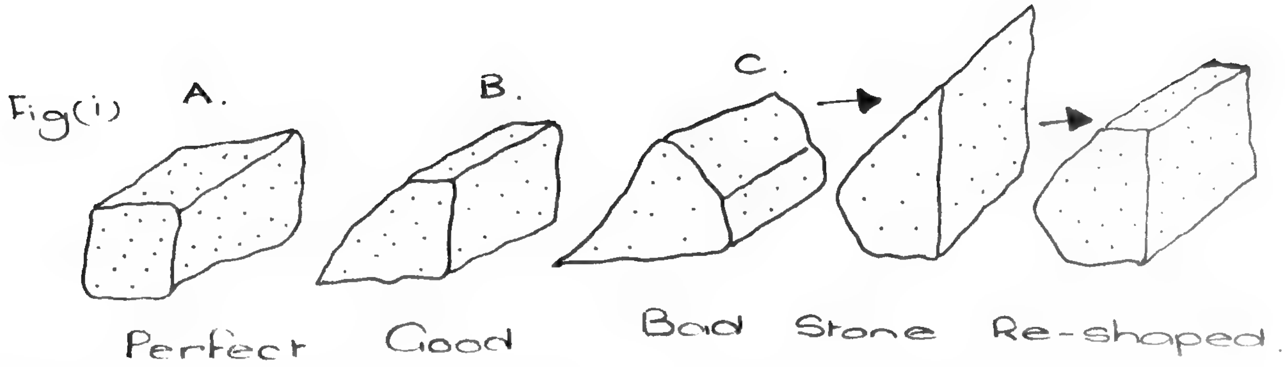
I have now completed almost half the stonework for the 24ft x 33ft building and I now consider I have just about enough experience to start! Isn't this always the way? Books can fire so much enthusiasm, but there is nothing like asking an experienced person the inevitable questions that still remain unanswered.

Okay. So you've decided to build in stone, knowing that it is going to be hard and slow. Where do you go from there? Firstly, find your source of stone. If your land has suitable stone on it, transporting it will be no problem. But remember that for even a modest-sized building, you will need a lot of stone and if it is hard to collect, it might be better to look elsewhere.

Your local cartage contractor will know all the quarries in the area, so look them over as a possible

Guide strings are attached to high stones set up plumb and allowed to firm.

Bolt together forms are easy to adjust. They are supported by the lower bolts.



source of supply. If the stone has to be carted too far, then maybe you should use some other building material.

Remember, stone is extremely heavy and you will need about one trailer load a day, or more, if you build your walls using the slip-form method.

Why cart it in a trailer? Partly cost, but also, unless you are extremely lucky, you will have to choose your stone carefully to avoid too much shaping or carting back.

What is good stone?

Assuming the stone is strong and not subject to decomposition after weathering, the *shape* of the stone is all-important. Depending on the method to be used there are different criteria by which the stone should be judged.

The shape of the stone for slipformed walls is not very critical. The stone is not necessarily a factor in the strength of the wall as this is provided by steel reinforcing rod. The stones only require one reasonably flat face and must also be thick enough to key into the wall. Not less than 4 inches thick seems adequate, but this will depend on how well the concrete is tamped, or whether mortar is placed between the stones before backfilling.

A stone suitable for laying must have, as well as the flat visible face, a base which is 90° to this and a top which is flat or sloping to the centre of the wall.

In *Fig. 1,* stone A is the ideal stone. Stone B will require mortar and small stones to build up the middle of the wall to form a flat base for the stone above. Stone C will not provide a stable base for the stones above, but it can be turned as in D. The sharp edge should be trimmed to give a flat level top.

The size of the visible stone helps decide the width of the wall. A 9 inch wide stone creates problems in a 12 inch wall, since a stone of something less than 3 inches thick must be laid to face the other side.

My walls are 12 inches wide, but they would be easier to build if they were 18 inches wide. It is not difficult to find fist-sized pieces of stone with which to fill in the middle of the wall. The wider walls would allow some larger stones to be used.

You are going to need a lot of stone with good faces, so be sure your source contains enough suitable stone to make gathering of it not too difficult.

By looking critically at the shape and size of the stone available a decision can be made to opt for either slipforming or laid stonework and the best width of your wall.

Slipforming

Slipforming is faster. But setting up the forms, pointing the walls and cleaning the stone can be laborious, a point glossed-over by slipform enthusiasts. The overall effect of a slipformed wall can be rather haphazard, lacking any suggestion of courses and thus having a different 'feel' to a laid stone wall.

Using only strings to guide the work allows each stone to be fitted against the next. At the end of a day's laying, or early the next day in cool weather, the stone can be cleaned and joints tidied up with a wire brush in a few minutes.

I have attempted to overcome some of the problems of slipforming by making forms held together by bolts made out of reinforcing rod. To prevent cement sticking to them, the bolts are wrapped in newspaper prior to filling the forms. The bolt threads allow easy adjustment of the spacing and the lower bolts can be rested on the top of the wall.

This means that the form can be removed the morning after filling and the cement cleaned off the stone before it gets too hard. Only enough forms are needed for one day's work. I used only two pair of 8 ft. forms and one 4 ft pair.

I now use the forms as scaffolding planks, for I find building without the restriction of the forms produces a wall in which the stones can be placed with more care. The wall seems to have greater unity and form and, to me, is more satisfying.

Laid stone

Laying stone between string guides requires care and patience. To start with, the string can be stretched between the profiles, but after some height has been reached, it then becomes difficult to locate them accurately.

By using a plumb bob, I set large stones at 8 ft to 12 ft intervals and build up at the corners. After the stones have firmed in place, the string can be attached to them, or to nails set in the wet mortar. A regular check on the width and plumb is necessary.

The rules of stone building

The apprenticeship of a stone mason in Britain is 12 years. What mysticism and magic does the old mason pass on to the apprentice to make stones stay put upon other stones for centuries?

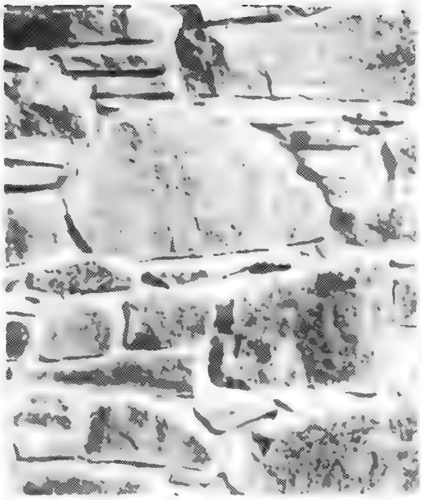
The rules of stone masonry are simple; it is their *application* that takes skill and practice and these rules apply equally to any method of construction.

There is nothing magic to make one stone wall stand while another wall falls within several years. The mason must be constantly aware of gravity — a force which will keep a well-built wall together while tearing another down.

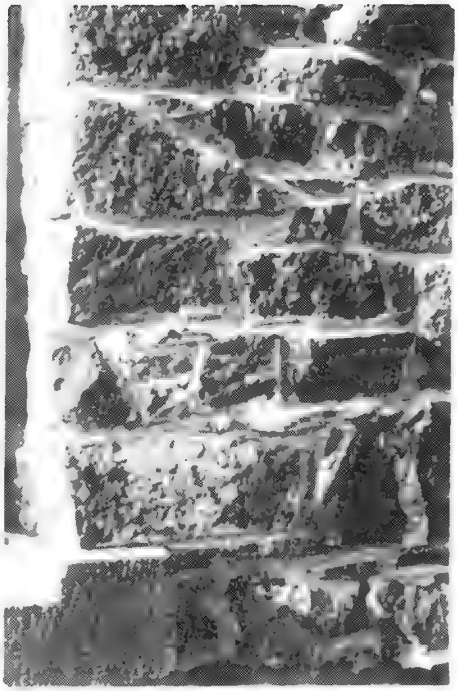
There are only two rules:

1) A stone must be laid so as to form a firm base for the stones which will be placed upon it.

Door and window frames have nails in the outer face to key into the masonry.



The wall has no courses, but has "form". One stone distributes its weight over two below.



Corner stones must tie back into the wall for stability.

The bluestone rubble barn takes shape.

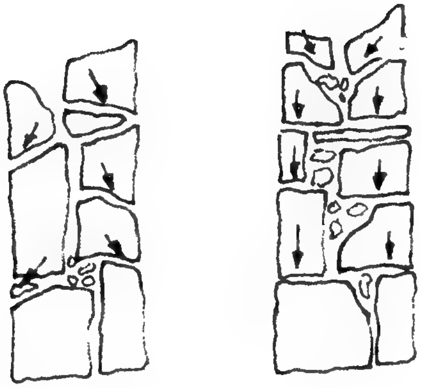


Fig ii

In *Fig. ii,* the arrows show how stones which have their top face sloping outwards resolve the force of gravity outwards, tending to make the wall unstable. A well-built wall should maintain the forces vertically, or resolve them inward.

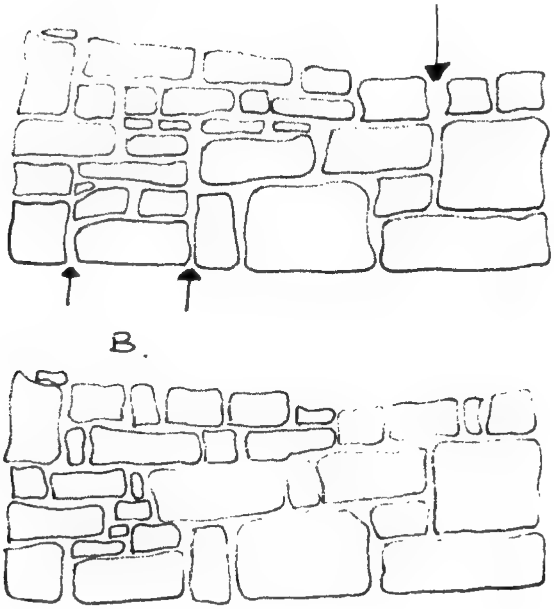
2) A stone should distribute its weight over two stones below it. This bonds the lower stones together, strengthening the wall.

It is this second rule which it is most tempting to ignore. Often, it seems, a stone will fit a given location nicely, except its end is over a joint below. It takes willpower to put the stone aside and find another, particularly if the space is proving troublesome to fill. Working in irregular stone which has few long stones can be particularly difficult.

Notice the vertical joints in *Fig. iiiA,* and how, by moving the stones around as in B, these weaknesses may be bridged, unifying the wall. Some joints remain over each other, but this is a necessary departure from the rule to allow for the difference in height between different stones.

Building is made faster and easier if your pile of stones contains many stones of similar height, allowing bridging without shimming.

Fig iii. A.



Trimming stone

The perfect stone to fit a particular place is often hard to find. Shaping stone is slow and tedious, but if a stone is close to the right shape and the offending edge is not too thick, then several sharp taps with a *mash hammer* (a short, double-headed hammer) can make all the difference.

The edge of the mash hammer is used to concentrate the impact to a smaller area, so less force is required to remove the unwanted stone. Many small blows are preferable to a heavy one, which often tends to break the stone in the least expected place.

It doesn't take long before just about every stone can be improved in some way by the touch of the hammer. *Watch your face and legs as the chips can be sharp.*

I have never had the patience to cut large stones, or to flatten a broad, domed top. I prefer to leave stones like this in the quarry.

The small pieces derived from all this chipping and trimming come in handy to fill the centre of the wall.

Reinforcing

A slipformed wall must include reinforcing rod, usually every 18 inches or less *horizontally* and a *vertical* rod every 8 inches.

A laid stone wall should not require reinforcing as the interlocking of the stones provides the strength. I have included a rod every 18 inches in my laid wall, but only as extra security. It does make laying more difficult. I also included vertical rods and continue with them because they will tie down the plate at the top of the wall.

Mortar

Mortar is not a glue with which you fight the force of gravity. If used this way gravity will eventually win.

Mortar is a cushioning which will fill the irregularities between the stones. It has a high compression strength, but little tensional strength. *The stone must be laid so that the wall could stand without mortar.*

There is an old bluestone farmhouse not far from here (Queenscliff, Victoria) that has stood roofless for over 30 years. The mortar in the lower part of some walls has been affected by rising moisture and has been completely washed away, revealing the shaping skill and building technique of the mason. The walls stand true as the day they were built over 100 years ago.

Openings

I brought some large old window sashes and for these I have made rough-sawn frames out of 5in x 3in redgum fencing posts. I also obtained the cut bluestone doorstep and window sills from a building wrecker. The window and door frames have nails driven into the outer surface to key them into the masonry.

The stones surrounding the doorway and windows require a reasonably square end. As suitable stones are found you should put them aside for this purpose. The end of the wall should be carefully keyed with the rest of the wall. This is usually done by alternating long and short stones.

I haven't reached the top of an opening yet, so I don't have practical experience in spanning space. Slipforming over an opening requires extra forming and reinforcing rod, but seems to present few problems, even over openings of 8 ft or so.

The whole project has evolved during construction — solving problems as and when they arise. I guess spanning the openings will be no different.

To date our barn has been under construction for 18 months, averaging less than one day per week laying, that is about 70-man-days. In that time I have loaded, unloaded and laid, 40 trailer loads of stones. There is probably another 12 loads to lay.

Comments range from: "Are you restoring the old barn?" to "Ya could've been using it if ya built it in iron!"

Yes, I could have built a steel and tin shed in a month, but my barn is built using a skill that will die out unless enthusiastic amateur masons continue to build in stone. Saving a dying craft must be worthwhile.

Books and comments

The Owner Builders Guide to Stone Masonry, Kern, Majers & Penfield, Owner Builder Publications, 1976.

A must for all would-be masons, or those just interested in stone walls. All the basic techniques of laid and slipform stonework are described in detail. The concepts of steps, floors, arches, retaining walls and fireplaces are described.

Several building projects are featured. This would have to be the most comprehensive book on stone masonry. It is now generally available after being rather hard to get in 1979.

Build Your Own Stone House, Karl & Sue Schwenke, Garden Way Publishing, 1975.

The Schwenkes give an informative description of slipforming the walls of their house and associated joinery and roof structure. A most useful book for those intending to slipform a stone house.

Living the Good Life, Helen & Scott Nearing, Schocken Books.

Chapter 3 contains a brief description of the slipforming technique used by this wonderful couple. They inspire all who read them.

Country Comforts — Designs for the Homestead, C. Bruyere & R. Inwood, Drake Publishers, 1976.

An interesting book, full of generally useful ideas, with a section on stone building. Of particular interest are the 6 inch wide slipformed arches and the idea of building a slipformed wall 18 inches thick, with a ½ inch polystyrene sheet in the middle for insulation and a moisture barrier. Ties are pushed through the styrene to bond the wall together.

This is an interesting alternative to lining the inside of a slipformed house with expensive panelling.

Solar Hot Water

Geoffrey Hopkins

Written and published by Geoffrey Hopkins, Flinders, SA, 1979, large format paperback, 72 pages, 70 illustrations.

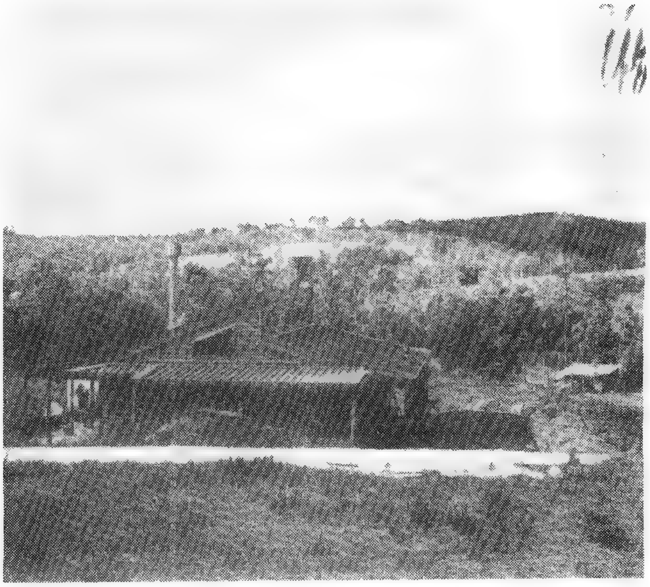
Geoffrey Hopkins is an Australian self-publisher who has compiled this practical, clearly explained work on solar hot water, including how to build your own solar heater.

The emphasis is on Australian conditions and the sources of information are also local. There's good background on scientific principles too and as **The Age** said it is "mercifully free of scientific jargon" (always a plus).

Solar Hot Water is at bookshops, priced at $5.00. If you can't find a copy, you can get it from Geoffrey Hopkins for $5.95 (including postage) from 438 Queen Street, Melbourne, Victoria 3000.

A low cost low energy mudbrick solar home

BY HELEN FENNESSY



Helen and Ben Fennessy and baby Daniel live in a "low-energy" solar home they built themselves from mudbricks. They have electric lights, television, radio and casette player powered by solar cells. They have hot water provided by their wood stove combined with a solar panel and a pot belly for winter heat.

The total cost of their solar hot water and solar electric system added up to $2260, about half the $4000 quoted by the S.E.C. to connect them to the outside mains.

The only fossil fuels they use are wood for their stoves and bottled gas which runs their refrigerator and washing copper. The telephone is the only outside service connected to their house — and there are no electricity bills any more.

Their solar-electric equipment came from John Paton, of Solar Charge (Aust), 6 St Ninians Court, Brighton, Victoria, 3186. The solar hot water panel and storage tank was supplied by Somer Solar, of Somers, Victoria, 3927.

Ben and I — and now baby Daniel — have been living in our solar-powered, "low energy" mudbrick home for about 1½ years.

We moved in after 10 months of pretty solid work when the house was ready to live in. We are still finishing off bits and pieces. It seems to be a never-ending, but enjoyable, job,

The house is a rectangular shape, its size about 10 squares. The design follows "low energy" housing principles: the living areas, kitchen, lounge and dining rooms face north and the bedrooms, bath and laundry are on the southern side.

There are full-length windows facing north and a two-foot eaves which allows the winter sun in but keeps out the summer sun. We also have a south-facing clerestory window above the living area which results in very light rooms.

The kitchen and bathroom are on the eastern end, so they get the morning sun. Windows are kept to a minimum on the south and west (weather) walls. The base is a concrete slab, insulated with polyurethane. The mudbrick walls are nine inches thick.

All these factors, combined with silver foil and two-inch fibreglass insulation in the roof and a two-inch thick packed straw ceiling, make a very pleasant and constant indoor temperature.

The house stays warm in winter, cool in summer. These simple and sensible design points ensure maximum use of the sun's heat and light — very important in our coldish climate in the Otways.

Our house is not connected to any outside services except the telephone. The water supply is from a 7000 gallon concrete tank filled from the roof. We also have a large dam we use for swimming, fondly known as "leech beach", which will eventually be used for watering gardens.

Our electricity supply comes from the sun.

We have five panels of solar cells which charge six 2-volt batteries. This is a 12-volt system which runs 15 small fluorescent lights, a water pump, which pumps from our storage tank up to the header tank on the roof and a television-radio-casette unit.

We had adequate power to run these all through last winter and we could probably also run a few other small 12-volt appliances for short intervals, particularly in summer.

Quite a range of 12-volt appliances are now available, for example vacuum cleaners, vitamisers, drills and hair-dryers. So far we have been content to use hand-operated tools for such tasks — a broom, grinder and mouli.

We cook on a wood stove, which is excellent. This, and a pot belly, heat the house. The stove also heats our water in conjunction with one solar hot water panel. We find this is quite adequate and we always have plenty of hot water. The stove and panel are a great combination. In summer, when you don't want your wood stove on, the panel heats the water. In winter the stove does most of the work.

We have a bottle gas refrigerator and copper. Laundry facilities are a bit primitive, but adequate. They consist of a double trough, a wringer, the copper and a good pair of hands!. This is one area we would like to improve on. Apparently it is now possible to get a 12-volt motor put into a small twin-tub washing machine.

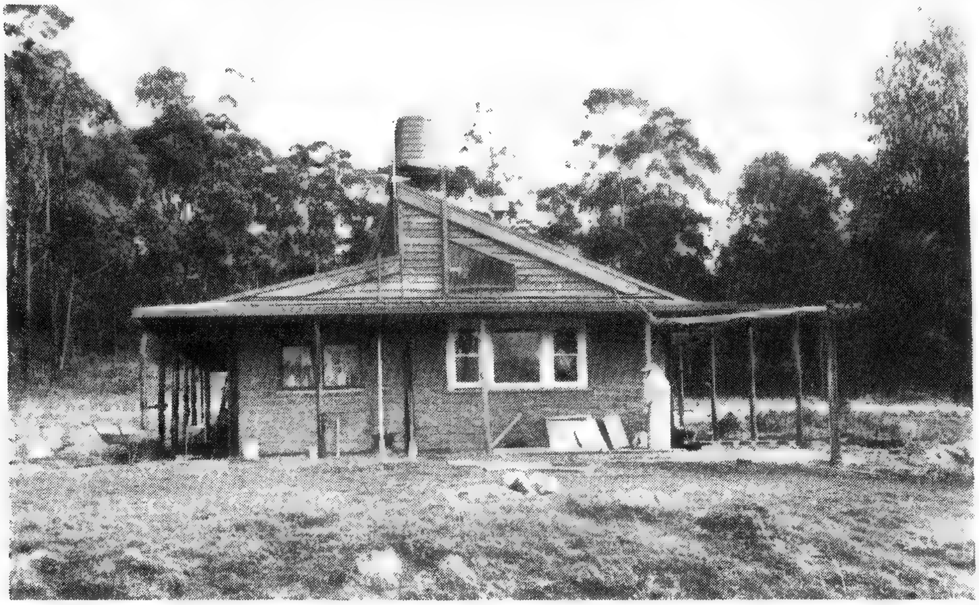
I have a treadle sewing machine and old flat-irons — I don't do a lot of ironing! We also have a few interesting gadgets, including a hydro-beater — a water powered mixmaster — and a fuel iron we haven't been game to use.

The cost of our solar-electric house was about $12,000 all told. That's with doing all our own labour, except for the concrete slab, with the help of some marvellous friends and family.

This price includes about $1900 for the solar electric system of panels, batteries, lights and one water pump. Prices for these have altered recently — panels are cheaper and batteries dearer. Our hot water panel and special tank cost $360.

We were quoted $4000 to have the S.E.C. connected, but friends a similar distance from S.E.C. power lines who were also quoted $4000 ended up paying $10,000! We felt that money was better spent on alternative energy. So for less than half the minimum S.E.C. cost we got a complete workable system — and no bills!

We are very happy and comfortable in our solar-electric house. All the hard work of building your own house is well worth it and alternative energy systems are viable now and don't have to cost a fortune.



View from the east soon after building.

Seeds for all

If everything we hear about the proposed restrictive varietal or plant breeders' rights legislation is true, then we in Australia are facing the greatest threat to self-sufficiency and organic gardening and farming that we have ever known.

The Parliamentarians are keeping quiet about it and we have not been able to obtain any firm information (from official sources) as we write this.

It is believed, however, that such an Act is pending and that it is scheduled for the August session this year. As similar laws have been passed in Britain, the European Economic Community, New Zealand and the United States (one is pending in Canada), this does seem likely if only on the basis that **nothing original ever comes out of Canberra — it just comes later.**

Such a law would take away the basic right of all people to grow their own food from their own seeds and would concentrate the ownership of seeds into the hands of a few powerful companies, including the oil and chemical giants which have begun to swallow up family-run seed companies and "corner" the world's seed stock.

Food plants, on which man and animals depend for survival, have always been a part of politics. Now they are at the mercy of the "big business" multi-national oligarchies.

The innocuous origin of foreign legislation was to "protect" the "rights" of companies which had developed hybrid strains and asexual and sexual varieties of seeds and trees and to allow these to be patented (how can a form of life, like a seed, even be patented?)

Newer legislation, such as the Plant Variety Protection Act of 1970 in the USA, and recent laws passed in Britain and the EEC, make it illegal to sell the seed of "patented" seeds owned by the seed companies or to grow seeds which are genetically similar. In the UK, this results in a fine of £400 stg ($A800) for violation.

Large-scale takeovers of small seed companies have followed instantly. In one week after the legislation in Britain, 84 seed companies were bought out by the giant food and chemical corporation Rank/Hovis McDougall. In the United States, Burpee and Gurney Seeds, which advertised for years in the pages of Rodale's **Organic Gardening & Farming** magazine were taken over by ITT (for Burpee) and Garden Products (for Gurney).

In the USA, Union Carbide absorbed Keystone Seed Co, Pfizer took Clements Seed Farms, Jordan Wholesale co, Trojan Seed Co and Warwick Seeds, Ciba-Geigy and Cargill took three companies each and Royal Dutch Shell two — and so it goes. A good report of all this was included in "Plant Patenting" in **Co-Evolution Quarterly** No 24, available for $US4.00 posted from PO Box 428, Sausalito, California 94965, USA.

Organic growing includes a diversity of food plants and types as part of its essential theme. Such restrictive legislation would mean the inevitable decline of the quality and variety of seeds. Those which do not yield a profit would disappear.

With the seed market in their grasp, the multi-national groups would market mainly hybrids, forcing growers to rely solely on the seed company for plants year after year. Seeds would be bred which require the use of chemical fertilisers and weedicides. This would make the growers dependent upon the company's poisonous products to add to their cynical profits.

This legislation is a restriction of our personal freedom. To fight it we suggest you lobby your local member of Federal Parliament, support your organic club or society and contribute to its seed bank, save your seeds, swap seeds with friends, avoid using hybrid seeds and, if such laws are passed, disobey them.

Support and offer help to the following groups who are gearing up to fight plant breeders' rights:

Petitions to the Senate and House of Representatives, Plant Breeders' Rights Committee, Camden Haven Organic Gardening Society, C/- John Owen, R.M.B. Hannam Vale Road, Stewarts River, via Johns River, NSW 2437 or John Skelton, 15 Illaroo Road, Lake Cathie, NSW 2446. Send a 22c stamp and long envelope for a copy of the petitions, which may be duplicated and signed by people against the proposed legislation.

Free Access to Seeds Committee, Food Justice Centre, Friends of the Earth, 366 Smith Street, Collingwood, Victoria 3066.

This committee has been formed in Melbourne to oppose the Plant Varietal Rights Act and to campaign for greater public involvement in plant conservation and breeding and the increase of genetic diversity in crops.

"This committee maintains that plants should be regarded as the common heritage of all people, and unsuitable for any form of exclusive control through patents, trademarks, etc. Seeds ought to be accessible to all people and their circulation unrestricted." Contact the committee if you would like to help in the fight against this restrictive legislation.

Self-Reliance Seed Co Pty Ltd, PO Box 96, Stanley, Tasmania 7331.

This is a small, privately-owned company formed by the Permaculture Association and Tagari Community at Stanley, Tasmania and the Tasmanian Organic Gardeners and Farmers Society to fight the impending plant breeders' rights Bill.

It also intends to "obtain, process and sell seed of known origin which has been washed and packed, to people who have donated or loaned money to the company" and will be a buyer of a defined set of plant seeds. Send $1.00 for further information. Self-Reliance Seed Co is also sponsoring a petition to the House of Representatives.

Find out more about the effects of plant varietal laws in other countries. This has been documented in **Seeds of the Earth — A Private or a Public Resource**, by P. R. (Pat) Mooney, Inter Pares, Ottawa, Canada, 1979, which is available from the Australian Council of Churches, 199 Clarence Street, Sydney, NSW 2000. Price $10.00.

To help save our seeds, we've decided to start a seed swap column. If you have any seeds which you'd like to sell or swap, even a few, let us know. Deadline for **Earth Garden 28** is September 15.

Tree Secrets

From our special correspondent, Dusty Wolfe.

Illustrations by Stella Baker.

"Trees are an exciting crop and return benefits far exceeding the effort needed to establish them," said Professor Bigbrain, who was addressing an audience of subsistence farmers at Woop Woop North.

"They utilise nutrients and water from deep under the ground which are unavailable to smaller plants." The professor paused and stared at his cosmopolitan audience, wondering if his message was getting through.

There seemed to be a lot of gaping and muttering. He noticed one man wearing a sort of primitive jacket made from a potato bag. Others sported blanket capes and weird home-made hats. Professor Bigbrain took a swig of amber fluid from the glass on the rostrum and proceeded. "Thus, trees are essential to the small landholder who wishes to make full use of his resources."

But the man in the potato bag was on his (bare) feet and shouting through his luxuriant beard. "Wait a minute, Professor, that's all right about plantin' the trees, but don't they take a long time to grow?"

"I hope this hippy freak isn't going to ruin my meeting," thought the professor. But he smiled tolerantly and replied: "Let me put it this way. Tree planting is just like gardening, only the plants take longer to mature. But some trees can be useful within two years. The Cape Leeuin wattle *(Albizzia distachya)* grows nearly as fast as a magic bean-stalk. It forms an attractive tree with copious bottlebrush flowers in winter to feed the honeyeaters. Put the seeds in a cup, pour on boiling water and let them soak a few days. Then plant them out in warm weather.

"Other examples of fast-growing trees are the black and silver wattles, which can produce firewood within three or four years of planting."

The man in the potato bag showed interest at this news. He was thinking of the approaching cold winter months when he usually wore an old eiderdown as a cloak. "Say, Professor, how do you grow those things?"

"Very simply," said the professor, again sampling the home-brew provided for his refreshment. "Gather your wattle seeds in late summer when they hang from the trees in twisting brown pods. In early spring, pop the seeds in boiling water for one minute only, soak them for a week, then plant out. They will be several feet high by the end of summer."

"Oh yeah?" interjected Potato bag, "my goat eats everything that comes up".

"Lock him up in the dairy then," replied the professor, sharp as a pine needle, "and he should make a good butter!" The audience failed to laugh, so he went on sternly: "Goats and tree-planting do not mix. Just like the garden, young trees have to be protected from grazing animals, including wallabies and rabbits."

The man who planted a sheepyard

"I knew a man," continued Professor Bigbrain, "who grew himself a sheepyard. A mutter went through the audience . . . the learned man had obviously been over-indulging in the home-brew. "I don't usually recommend the planting of Radiata pine," he said, "because of its adverse effects on the soil, but in this case it proved very useful. My friend planted the trees in the shape of a sheepyard, about six inches apart.

"They grew up in a dense wall and he kept them pruned off at a height of ten feet. After five years he had a beautiful, shady, cool yard for shearing and drenching the sheep. Not only that, the combination of sheep-droppings and fallen needles made a fine compost for his garden."

"Can you grow the pines from cuttings?" asked a brown lady in a brilliant floral dress.

"Not in this case," the professor replied, "but if you used Tamarix, the Athel tree, cuttings would be suitable, as you suggest.

He took another sip from his glass. "Now, how to grow the pines? Let me think." Tlhe home-brew was certainly strong stuff. He leaned over towards his audience in a confidential manner. "Well . . . *When the feathers of the willow have some of them grown yellow*. . . I mean late-summer, early-autumn, that's a good time for collecting tree seeds. The best system is to go to a pine plantation where cutting is going on. The fertile cones are shiny brown in colour and tightly closed. The old greyish cones are useless, but you may as well collect a bag of them for firewood. Leave the cones in a sunny, dry, mouse-free place till they spring open and the seeds fall out. In spring, soak the seeds for three days, then plant them half an inch deep, about fifty in each lineal foot of drill.

"Referring back to the business of cuttings, raised by the attractive lady in the front row, some of the easiest trees to grow are poplars and willows, but keep them away from the drains. When the buds start to swell in early spring, cut pieces up to one inch thick and five feet long. Make holes in damp ground with a crowbar and shove them in — right way up, of course — ha ha!"

Somebody was topping up Professor Bigbrain's glass again. They were certainly hospitable people around here. "There are a number of different willows. The black willow yields aspirin in its underbark and was used to treat fevers by the American Indians. And we all know the pussy-willow, so popular with children."

"No good for us!" cried Potato bag. "On our co-operataive no cats are allowed!"

"Before I finish, in a nut-shell," smiled the studious gentleman, who was now swaying slightly, "I want to talk about our most versatile and useful tree, the eucalypt. You may be surprised to learn that *eucalyptus* is easily the most popular of all trees in overseas planting. Brazil, for example, has more than two million acres. Portugal has established 150,000 acres of bluegum plantation alone. So the Australian 'gum tree' is world famous, but subject, sadly, in its homeland, to waste and abuse.

"Eucalyptus seed may be gathered by visiting logging areas, from wind-fallen branches, or by climbing and cutting off limbs with a handsaw. Collect the closed, mature capsules or gumnuts and put them in a box or paper bag in a dry place until the seeds fall out. Some care must be taken as the seeds are very fine, like grains of sand.

"In Spring, sieve some composted soil into a wooden seedbox. The box should be about six inches deep and three quarters full of soil. Suitable soil may be found in the bush at the base of old peppermint trees. There should be holes or cracks at the bottom of the box for drainage. Sprinkle the seed thinly and press into the soil with a small, flat piece of wood. Then cover with a thin layer of vermiculite (soil conditioner) if available. If not, use sand. Peat moss tends to wash away from the seed when watering. Vermiculite is best as it forms a firm, moist layer which the seedlings can easily penetrate.

"Tack a piece of fly-wire over the box to protect the tiny seedlings from birds, mice and the weather. There should be at least one inch space between the soil and the fly-wire. When the seedlings reach the fly-wire it can be removed.

"By this time they will be ready for transplanting into pots or tubes and this should be done while they are very small, at the two-leaf stage. A kitchen tablefork makes a useful tool for transplanting. After a few months in the pots the young trees will be ready for planting in their final position. This may be done when the wet weather arrives, or sooner, if they can be watered."

After this verbal marathon, Professor Bigbrain felt he deserved watering himself, and partook accordingly. "In conclusion," he beamed, "I would like to put everything in a nutshell:

Sow the seeds, remove the weeds
And keep the goats away.
Those little trees will fill your needs
Upon a later day.

The professor staggered from the rostrum to enthusiastic applause. "I wonder if someone would be kind enought to give me a lift to the local railway station?" he asked.

"A railway station at Woop Woop North!" guffawed Potato bag, "You'd have to be joking!"

But how can I get transport back to the city?" queried the alarmed professor.

"Arr, you'll be right. You can get a ride in with old Betsy tomorrow. You better come on home with me tonight, we'll fix you up a shakedown in the goat-shed. Besides, I want to find out more about making that butter."

Was old Betsy a horse or a person? Professor Bigbrain wondered, but he set off happily enough with Potato bag. The two men wandered off down the track across the bare plains where the vanished rain-forest once grew.

To be continued. Watch for another report in our next issue in which Professor Bigbrain visits the Potato bags, meets the goat and builds a plastic greenhouse.

Native tree crops

PERMACULTURE IS NOT A BLUEPRINT

By John J. Alderson

I heard Bill Mollison speak on permaculture at Maryborough (Victoria) and was bold enough to ask, during question time, whether blackfish would fit into his aquaculture scheme.

He suddenly looked very pleased and said it would fit in splendidly. The truth is, of course, that Mollison believes very much in the Australian ecology, but the superficial reader or listener would not gain that impression.

This may be because he uses a great deal of overseas material, but when one reflects upon this, it is unfortunately true that we just don't have the Australian material from which to draw.

Take, for example, fodder trees. I have searched that wonderful series, *Australian Plants* and found only accidental references, one for instance on the wilga *(Geijera parviflora),* which has to be planted away from stock because they eat it. It is reputed to be one of the finest fodder trees in the world and in a major work on Australian plants that point rates only an accidental mention. Australian research works in a vacuum.

In response to the rapid interest and acceptance of permaculture, the book *Permaculture One,* by Bill Mollison and David Holmgren, was hurried into print. It has no index and lists of species and the like are clustered together with a merciless disregard for order.

Continual reference to the need for research and experiment has been heeded by many and disregarded by others. One local woman after putting what she thought were the right principles into effect, invited others to a field day on her property and explained that she had planted the native trees, being quicker growing, until the "better European species" became established.

But this is not Bill Mollison's philosophy at all, it is the reverse. Whilst *Permaculture Two* goes a long way to redressing this impression, the unwary can still be led astray.

However, working groups have sprung up all over the country and they are trying out permaculture principles in some form or other. Mollison apparently assumes that those who are interested will *know* the fundamentals of ecology and thus hardly mentions certain essentials in *Permaculture One* — with only passing reference to pollen or nectar-producing trees, for example, with no note that these are essential parts of the scheme.

Let me say here that I believe permaculture to be a wonderful idea. I was considering some such scheme long before I heard of Bill Mollison. I am convinced of the sound commonsense of the idea and have expanded my plantings in that light. What I say is not a reflection on either the men or the idea.

But some of the "ideas" are quite dangerous. The unrestricted planting of prickly pear (*Opuntia vulgaris*), some of the mesquites (*Prosopis* species) and kudzu (*Pueraria thunbergiana*), as examples, could be disastrous. Mesquite is a noxious weed in Western Australia, as is African boxthorn (*Lycium horridum*) in Victoria and so is hawthorn (*Crataegus* spp) and St John's Wort (*Hypericum perforatum*).

On the other hand, the species list in *Permaculture One* is 95 per cent *foreign* and our native birds would starve amongst them.

There is only one acacia mentioned in the species list and not a single eucalypt (though both are given scant mention as bee forage plants).

This is despite the fact that acacias are legumes; despite the useful tannin bark of the acacias (and some of the eucalypts); despite the use of both species for timber, joinery, posts, firewood, sawdust for mulching; despite their production of valuable gums, kinos and oils; and despite the use of some of the acacias for animal fodder.

Now to correct this imbalance, get hold of and study J. H. Maiden's *The Useful Native Plants of Australia* and don't think it's the last word either. It isn't.

There is some notion (in trash composting and almost reading between the lines) that one has a vegetable garden as well, but no mention at all of a flower garden, let alone a wood-lot.

This is not the philosophy of *Earth Garden,* nor the philosophy of living in harmony with nature. Worse than this, it has been tried before and the unnatural experiment is examined in Coral Lansbury's *Arcady in Australia.*

Our forefathers damn near ruined this country trying to turn it into another England and they broke their hearts in the effort. This is not what we want.

Nor, for that matter, can we restrict ourselves severely to native plants. We must trace some sort of path between the ecological "racism" of replacing everything with exotic species and the "purism" of having nothing but Australian natives.

I don't believe all this is intentional. It is partly due to the fact that Bill Mollison is a Tasmanian and his cast of practical knowledge is Tasmanian, so his outline of permaculture is admirably suited to Tasmania.

He makes mistakes when he tries to expand this practical knowledge to the other island of Australia. For example on page 67, *Table 7.1.9* gives a suggested number of particular plants as sufficient for an undisclosed number of individuals. It includes 21-50 olives, 6-20 walnuts, 2-5 grape vines (!), one lemon and no oranges.

I doubt if this is well-balanced, even for Tasmania. But I use it to show what care must be exercised in using these tables and lists of species. For all the mainland of Australia then, until well up into the north where such things as vines and oranges don't grow, let's modify the picture.

Remember that the currant bush (*Ribes* species) will not succeed north of the Dividing Range and if we want currants, we need several currant *vines*. As these are lovely to eat fresh and are the first to ripen (say the beginning of February or earlier), we have to allow for fresh fruit before there are any left for drying, say five or 10 vines per family, if there are children. The yield (commercially grown) is about 20kg per vine, or about 3½kg of dried currants.

The sultana is a fine eating grape which ripens in mid-February and will hang on the vine for several months. At least five more vines will be needed for fresh fruit. Dried, sultanas are essential ingredients of steamed puddings, cakes, emergency rations and almost all fruit wines. A good vine will yield 40kg of fresh grapes or eight kg of dried sultanas. Work out your sultana requirements and plant vines to cope.

Now we have the *Gordo*, which is a table grape. It does make wine, but it is the basis of raisins. Plant accordingly. By the way, Gordos are subject to sun-scald and, as they are a low vine, they can be planted beneath the sultanas or currants, or even the *Waltham-cross*. These latter are beautiful eating grapes and are dried into *Lexias*, which is a dessert raisin. You'll need at least as many Waltham-cross as Gordos. This will get you to April. There are later grapes for May and even June.

But, if like myself, you like wine, you will need some wine grapes — red grapes, depending upon your taste and the district. Consult locals or the Department of Agriculture in your State, or better still, the CSIRO at Merbein, Victoria, which will supply cuttings for Victoria.

Just in case I should be accused of *assuming* you know, there are several hundred grape varieties, suiting a wide variety of soil types, water-requirements and climate, tastes and uses.

As for the lemon, you really need two trees, one for winter and one for summer, but I am at a loss to explain how this can be organised. A family would require three or four trees of each of Navel oranges and Valencia and perhaps a couple of mandarins.

It would be folly to plant 25-50 olives if you don't use them, in which case half a dozen at strategic intervals should be enough for the fairy wrens to play in and to supply bird-food.

Thus *Permaculture One* has to be modified to suit the rest of the country. It is also weak in the use of Australian resources.

Now *Permaculture Two* does remedy some of this. In addition there is a species list of some 1000 species, hopefully ready at the time of writing, but not yet received, which may considerably alter the picture.

In any case, I would like to help matters along a little with some suggestions that will strengthen the use of Australian resources, particularly as the authors speak continually of the need for information.

...for fruit and fodder

All the local eucalypts should be preserved and added to, unless your bush block is uncleared. They provide beauty, honey, timber for building, posts and rails for fencing, wood for fuel and a continual rain of debris for mulch. They also provide a range of dyes.

Wattles will add an immense quantity of seeds which birds, including fowls, will eat. Several are good fodder trees and some yield valuable timber and wood for carving. Frankly, the uses of many wattles have been barely investigated.

Wild fruit

The lillypillies yield masses of fruit, which make wine, jellies and jams and may be put into fruit salads. Botanists have recently split the classification of these rainforest trees into *Acmena* and *Syzygiums* from the former *Eugenia*, which is the name you will find mostly when using older books. We will stick to the old form.

Lillypilly.

As the lillypilly fruits fall continually over several months, they provide a great deal of chook food, particularly the more ornamental types grown for their berries.

Eugenia smithii (syn *Acmena smithii*) is an excellent tree of rapid growth, stands heavy pruning and provides fruit by the hundredweight. Other members of the species, such as the bush cherry, *E. australis* (syn *Syzygium paniculatum*) and the red apple, *E. bruchyandra*, are sold commercially as fruit in some places.

E. smithii and *E. australis* are available from Victorian Forestry Commission nurseries (and probably also those of NSW varieties). Eugenias are a species spread around the world and include the famous *pimento*.

The kangaroo apple (*Solanum aviculare*) — there may be species, or at least varieties — has berries of some size which are eaten by birds. It contains some steroids, which were used by the Aborigines as a contraceptive and are under study in the Soviet Union for the same purpose.

They may be safe for males to eat, but I suggest you try them first on a white leghorn rooster. There is some research and field observation needed here. The solanum family is very large and includes the tamarillo (tree tomato) and the Apple of Sodom, a most valuable species and subject to easy and great development. The herbal use of the species is great also.

Edible food in Australia is a neglected study. One might try the black apple (*Sideroxylon australe,* syn *Planchonella australia*), the geebung (*Persoonia* spp), Molucca bramble (*Rubus moluccanus,* or *R. hillii*), the native raspberry (*R. rosaefolius,* or *R. parvifolius*) — the leaves of this are better than the cultivated variety for diarrhoea and child-bearing and birth, stopping the former and helping the latter proceed smoothly.

Other berries include the wild grapes *(Cissus* spp), blueberry ash (*Elaeocarpus cynaeus,* syn *E. reticulatis*), the scrambling lily (*Geitonoplesium cymosum*) and the common apple berry (*Billardiera scandens*) with its fleshy, edible fruits.

Many of these are worth cultivating for our own eating — the chooks will eat the rest. Improved varieties should always be looked for.

I have eaten the white stems of the kangaroo paw (*Anigozanthos* spp) and lived. The taste was a little bland, but the texture was excellent and, as I didn't use salt, they may yet form a part of every vegetable salad. But I have not read anywhere that they are edible. Who knows, the kangaroo paw may yet rank like the tomato, grown for centuries for their beauty, before anyone tried eating the berries!

One might also try the blue lilly (*Stypanda caespitosa*) and the blue flag lily (*Dianella laevis*) and their relatives for their soil-holding abilities on banks. Native pig face grows well in clay soil as well as sand and there are also completely prostrate wattles which grow on coastal sandhills which may hold drifting sand.

Fodder trees

The kurrajong (*Brachychiton populneum*) is worth growing for its fodder value. In the good old days, kurrajong on a New South Wales property was considered to be worth £25 as a fodder reserve. Even the branches and stems are eaten by cattle and during droughts some of the more barbarian pastoralists have had the entire tree pushed over by a bulldozer for fodder. See Kurrajong Brew, *Access 1* (EG 22-3), pages 56-58.

The Illiwarra Flame Tree (*B. acerifolium*) is vain. It drops its leaves so that beholders can give the flowers their undivided attention. I don't think anyone could ever forget seeing their first flame tree in bloom. But, like the kurrajong, it provides fodder by way of leaf and fern for man and beast and for bird by way of seed. The trunk also has a fibre if needed.

The bottle tree (*B. rupestre*) is an even better fodder tree. The name means *rock-site loving,* so there's a clue for you. Everything of this tree is eaten by cattle, though presumably one has to dig up the roots for them. There are other brachychitons covering a wide range, from the temperate zones through the arid to the tropics. They are said to be the easiest of Australian trees to grow, but rabbits love them.

The kurrajong and the flame tree, whilst they will grow in clay (slowly), will grow with geat rapidity in sandy soil. They produce an enormous taproot, growing to great depth, and surface feeder roots. The bottle tree and the kurrajong also store water in their roots.

The river she-oak, or sheoke (*Casuarina cunninghamiana*), is a fine windbreak and soil-binder, grows well along streams and is a good fodder tree. In other words, it could replace willow. All the casuarinas are fodder trees and most of them make a good, heavy dark timber, though some will not last well in the ground. Splendid firewood, too. The mistletoe which grows upon them is one of the most beautiful of mistletoes and provides an important part of the diet of many native birds and animals. It is, herbally, a useful mistletoe, being a good nervine.

The mulga (*Acacia aneura*) is a good fodder tree and produces a highly coloured and figured timber. Several other acacias are fodder trees — and they are legumes, too.

The wilga (*Geijera parviflora*) is reputed to be the greatest of all fodder trees and apparently grows in a wide range of conditions. It is sold by the Creswick Forestry Commission Nursery (Victoria). Nearly all these fodder trees are available at some Forest Nursery or other.

Saltbushes (*Atriplex* spp) may not be trees — they range from large shrubs to entirely prostrate plants — but they are such good fodder they are rarely seen. They must be grazed very lightly or for a short time, even by fowls and if most of the woody part is left, they regenerate reasonably quickly.

The silky oak, or silkoke (*Grevillea robusta*), is mainly a timber tree, but one of great beauty. It gives great quantities of nectar (it actually *drips* from the flowers) and seeds for the birds. It is very hardy and grows in a wide variety of situations. The lesser grevilleas are undercover shrubs and provide much seed for birds, as well as nectar and beauty.

The camphor tree (*Cinnamonum camphora*), even though not a native, is worth considering. It grows up to 10 metres (hum, that's what the book says — there is one near where this is being typed that must be 15 metres!). It is a beautiful tree and a source of camphor, which is extracted from its leaves and twigs. It also produces the famous camphor wood, which makes those boxes so superb for storing embroidery. It is obtainable from Victorian Forest Nurseries.

It must be appreciated that Australia does not have the developed food plants of the Old and New Worlds (the Americas). I agree that we should develop our resources in this direction, for example the quandong (see *Earth Garden 26,* page 11).

Kangaroo apple.

Bill Mollison has suggested using the wallaby as a stock animal. Many water fowl are easily domesticated. Many birds are known to be good food, hence their present scarcity. Possibly their domestication would preserve the species.

The bronze-wing pigeon (in no danger of extinction fortunately) is splendid eating, takes to exotic grains like wheat readily — in fact the bulk movement of wheat has been a god-send to them. But the pigeon builds a small platform from which most of the eggs and nestlings fall. A wire netting platform added builds up the family size considerably and domestication would probably be easy enough.

But we do have fully developed timber trees and only a few special exotics would be warranted. We have excellent fodder trees we should use. We have spendid grasses and fodder plants and little need for exotics. We also have excellent cover plants, ranging from shrubs (acacias) to nodding saltbush.

We also have a large array of Australian herbs, some rather distinct, and others with properties similar to plants of the same family overseas. Some research has been done, but more remains.

Now all this, while not so obvious in *Permaculture One*, is more obvious in *Permaculture Two*. But it *must* become obvious to every permaculture enthusiast.

There is some mention of irrigation in *Permaculture One* and the keyline system in *Permaculture Two*, but the establishment of a working area as outlined in the books would take up a costly amount of water — water that isn't easily available (except perhaps in Tasmania).

Certainly one can establish a walnut tree so that after a couple of years it does not need watering (in northern Victoria), but it will take a century or so to grow and bear. Even the drought-resistant carob will not grow without water in the first few years. I know, I have four-year-old trees as many inches high.

This is why we must use the local, even drier area plants, to *realise* we live in Australia. For our dear old country doesn't love foreigners — they die of thirst.

Nor let us kid ourselves on certain aspects we might otherwise prefer not to talk about. Permaculture is political dynamite. Any large-scale application of its principles is going to totally revolutionise our economy and social structure. Most of the building ideas Mollison advocates are not permitted under Local Government regulations. Many of the industries associated with permaculture are also either not permitted or subject to severe restrictions.

The Health Acts do not permit many of the ideas. Domestication of native fauna is virtually prohibited, the species concerned are either being protected or vermin! Native plants often come into these same categories. Widespread acceptance of permaculture will almost certainly mean further restriction in this direction and rigid application of byelaws regarding the number of people allowed to live on a given area. In some parts of the country only one family is allowed on an area of 100 ha.

More difficulties are to be expected from State and Federal levels with, for instance, the more rigid application of laws regarding quotas and so forth for the growing of certain crops, eg, eggs, barley, oats, sugar, dried fruits and so forth.

Nor do I think Bill Mollison's ideas of doing away with boundaries and the idea of property very practical. Do this and eventually one man ends up claiming ownership of everything and enforcing that claim by Act of parliament or an army — remember the enclosures of British commons? Communal ownership, with a register of owners, is however, a different thing.

Let's not be naive about the political implications of permaculture. I don't mean that permaculture is wicked, but there will be those who say it is and act accordingly and permaculturists may well face the prospect of fighting for their lives as well as their rights. Let's just keep our eyes open.

Permaculture *is* a wonderful idea, but it must be fitted to the country where it will be used. This means a whole range of experimental plantings of our own species and perhaps generations to improve them. It's essential.

But we must cut our cloth to suit our purse. It is pointless trying to grow pawpaws in Tasmania or blueberries in Cairns. Otherwise permaculture is going to mean heartbreak.

Permaculture is not a blueprint; it's a principle, and the application of its principle should give rise to almost infinite variety. It is, after all, living with nature and nature is rather prodigal with her variety.

Permaculture Quarterly

Quarterly, 44 pages, illustrated. Four issues posted $8.00 payable to National Permaculture Association, 37 Goldsmith Street, Maryborough, Victoria 3465.

Terry White is the editor of this, the national Permaculture magazine, which began in late 1978. It is a forum in which ideas, events, resources and people involved in P.C. are recorded, hints are passed on and details and criticisms can be noted and assessed.

Permaculture Nambour newsletter

Autumn 1980 issue, 36 pages, roneoned foolscap size, posted 80c, plus 22c stamp and SAE for Nambour membership to Max O. Lindegger, 56 Isabella Avenue, Nambour Heights, Queensland 4560.

Permaculture Nambour is aiming to evolve a sub-tropical system suitable for the Sunshine Coast, set up a local seed bank and exchange seeds. The newsletter has stories on plant breeders' rights, organic poultry feed, book reviews, bunchy top in bananas, bees and earth building notes from Brian Woodward of the University of NSW Earth Construction Research Unit.

HUNTER ORGANIC GROWERS' SOCIETY (H.O.G.S.)

The Society was formed last July to enable folks in the Hunter Valley to get together and support one another in the endeavour to become more and more self-sufficient, and attempt to grow our own food without poisonous chemicals.

Membership is $2.00 per year and we publish a newsletter. There are about 100 households in the group already.

Send SAE for further information to: Judy Miller, Secretary/Treasurer, H.O.G.S., C/- PO Kitchener, NSW 2325.

ANIMAL STORIES

Livestock, including bees and sheep, will be a topic of **Earth Garden 28**. We'd also like to hear any amusing stories on animals, both domestic and native, that you might like to send us. Deadline September 15.

FOOD PLANTS FOR TROPICAL AUSTRALIA

BY LEN MULLER

Australians have become very interested in tropical foods.

No wonder, because supermarket vegetables and fruit are so dear, so tasteless and so monotonous.

In northern Australia supermarket-type vegetables — or many of them — can be grown in the cooler months when the heavy rain is over, but Asian, African, West Indian and South American plants are less worried by pests; and these semi-wild, village varieties are more tasty than their civilised relatives, as well as being more nutritious.

Thanks to interested nursery people and enthusiastic home gardeners, many tropical food plants are now available here and we are not faced with trying to grow crops from unsuitable seed and grafted stocks.

The recent influx of seeds and grafting material from tropical America and Asia into the Cairns region is truly bewildering in extent and I think we can safely boast greater variety than anywhere else in the world.

In this list, plants were chosen which will provide food that most people would enjoy and which are farily sure to succeed in your tropical garden. It is intended for people who already live in the tropics — those with a small plot of suburban land, who want to grow food for themselves which is tasty, nutritious and free of lethal sprays.

People who are making the big escape from the evil city are also sure to find it useful, as will nurseries with an eye to the expanding demand for plants you can eat as well as use for landscaping.

AMARANTHUS *(Amaranthus gangeticus).*

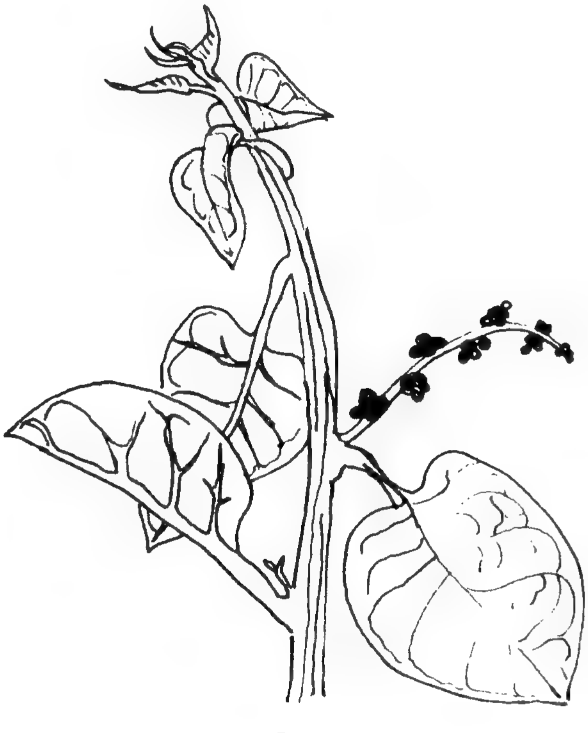
Also called Chinese spinach, bayam, Bhaji, Tampala, or Indian spinach. A common weed in good soil where there is sufficient water. Other species of amaranth are grown for grain, stockfeed, or ornament. All are edible.

The young leaves and stems are cut up and braised lightly in oil or coconut cream until just wilted. Of ancient cultivation, said to be the best of all tropical 'spinach' type plants in flavour and food value. Sometimes available in shops in Darwin and Cairns.

Len Muller has written a resource work which covers growing and using 104 food plants suitable for tropical Australia. These include perennial tree crops, leafy greens and legumes and annual plants. It is a large manuscript, of which this section is only the first third, covering A-C. We plan to publish the second segment in Earth Garden 28 and the concluding part, with a bibliography of useful books, in E.G. 29.

Len is a member of the Rare Fruit Council of Australia, which has as its motto: Eat your landscaping! He also did the excellent illustrations.

Amaranthus gangeticus or Chinese spinach.



Basella or Ceylon spinach.

ARROWROOT *(Maranta arundinacea)*.

Grown in gardens as an ornamental with green and white leaves. At the end of the wet weather, the plant dies down and small white tubers may be dug from the ground. When boiled, these tubers are pleasant to eat, although too crunchy for some. Good for people who favour variety and a high-fibre diet. The plant is the source of commercial arrowroot.

AVOCADO *(Persea americana; P. gratissima)*.

Well known avocado is usually cultivated as a grafted tree but may be grown from seed if not for commercial purposes. Rootstocks used in southern Queensland are not suited to all localities and may do poorly. Avocadoes need ample water but good drainage. Advice should be sought from your local Department of Primary Industry advisers.

In some areas around Cairns and Darwin, avocadoes do well, in others pests can be the bane of their lives. The fruit is one of the best foods produced in the tropics, and the basis of the famous Mexican dish *guacamole.* It is also expensive, so those who can, would do well to grow their own. The explorer William Dampier said he was told that the fruit 'provoketh towards lust' and therefore it was much esteemed by the Spaniards. Those Spaniards knew a thing or two!

BANANAS *(Musa* species).

Hundreds of varieties of edible bananas exist in the tropical world and many others which, though edible, are full of seeds, sometimes as big as a marble.

Although Captain James Cook observed wild bananas in Australia, they were too seedy to be of any use. The tourist may see some of these bananas on the way to Cape Tribulation, north of Mossman. Perhaps about 20 varieties of introduced edible bananas may be looked upon as common in Australia today. These include tall and short plants and red skinned as well as the more obvious Cavendish and sugar bananas.

Plantains are also grown in Carnarvon, Western Australia, Darwin, Northern Territory and in Cairns. These are drier in texture than bananas and not as sweet. They are used for 'chips', in savoury fritters and casseroles.

BARBADOS CHERRY *(Malpigia glabra)*.

Also called acerola.

A large, straggy shrub with small pink flowers and red shiny acidic fruit about the size of a large cherry

BARBADOS CHERRY RECIPES

BY ANNE TOPPIN

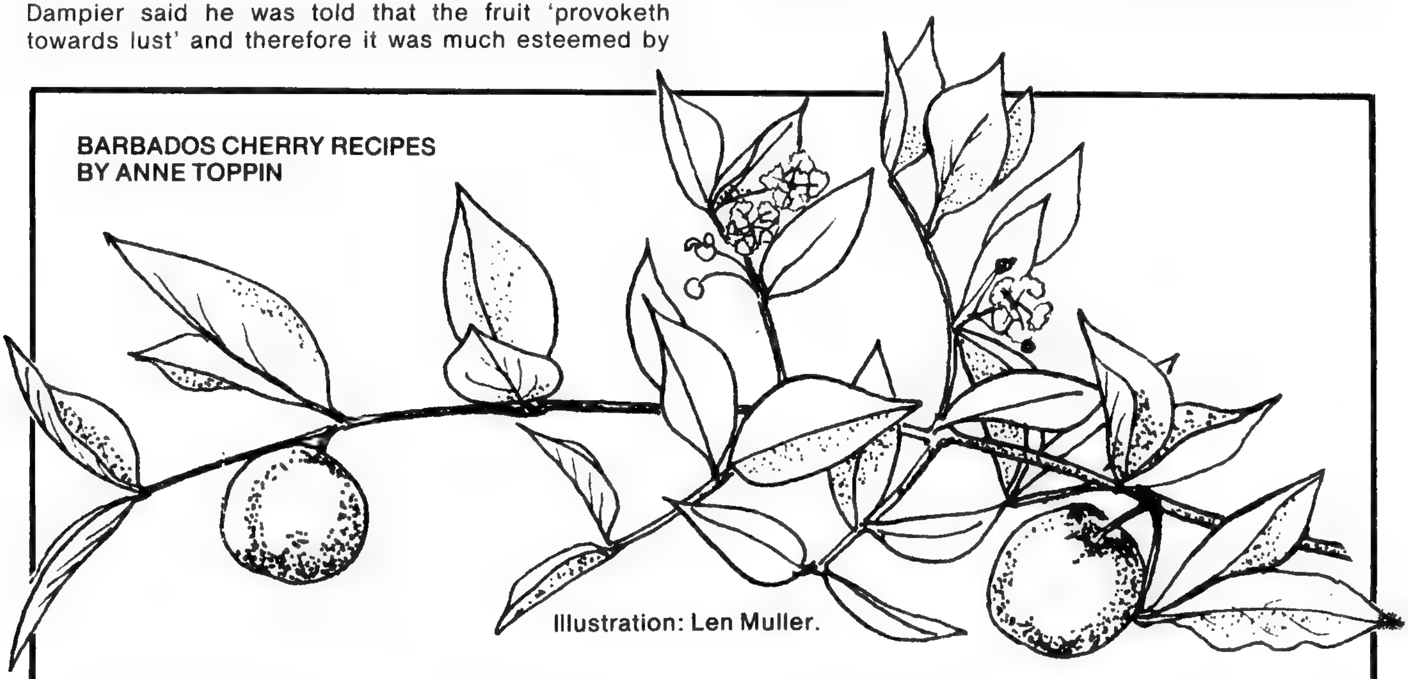


Illustration: Len Muller.

Grannie's cherry jello

Mash the cherries with a potato masher and remove seeds. Sweeten pulp, juice to taste and chill. Mix a packet of any red jelly powder, chill until nearly set, add cherries, mix well, and complete setting.

Jam — Bahama recipe

Remove seeds and weigh pulp. Add equal amount sugar, sprinkled in layers with fruit. Cover with cloth and leave overnight. Next day bring to the boil, stirring and simmer till smooth and thick.

Jam — easy recipe

No need to remove the seeds. Steam fruit (using just enough water to prevent burning) until juice forms. Add an equal amount of sugar and stir until dissolved. Boil until set.

Jam — traditional Barbados method

Cook 3 cups stoned cherries with their juice until tender. Add 4 cups sugar, stir untill dissolved. Cook until set.

Cherry jelly

Cover fruit with water and simmer 20 minutes. Strain off liquid. Measure it and boil again. Add equal amounts of sugar. Cook until it jells.

Cherry juice

Crush 2 cups cherries and cover with 2 cups hot water. Leave 1 hour. Strain, sugar and chill to serve.

Cherry ice-cream

Crush 1 kg cherries in a bowl, remove seeds, add to your usual ice-cream mixture, then sugar to taste and freeze.

Cherry granita

Remove seeds. Add ¼ cup water to pulp and juice. Sweeten to taste. Freeze. Scrape with a fork and pile in bowls to serve.

Anne Toppin, formerly of Barbados, now lives in Cairns. See: **Tropic Delights** (E.G. 12, pages 8-10) for more of her tropical fruit recipes. **Reprinted with permission of the Rare Fruit Council of Australia.**

which are high in vitamin C content. Juicy, good in drinks, jams, jellies, as well as fresh fruit. Propagated by cuttings, which strike readily, or seed.

BASIL *(Ocimum basilicum)*.

Sweet basil. Several varieties of basil will grow in the tropics all year round if given sufficient water. Grasshoppers love it. Although strong, a nice flavouring herb for garlic and herb bread and meat and vegetable dishes. An attractive bush for the landscaper.

BILIMBING *(Averrhoa bilimbi)*.

A small tree with light green feathery leaves, bearing bunches of green oblong fruit about the size of a gherkin. They are sour but refreshing, and the juice may be used in the same ways as vinegar or lemon juice. People who like sour fruit will enjoy eating it alone or in a fruit salad. Pickled in salt brine in Indonesia, also made into spicy pickles and sambals, related to five-corner, known in Indonesia as *bilimbing manis* (sweet).

Bilimbing is a handsome tree, growing as high as 6 metres. Bunches of flowers and fruit form on mature wood. Mature leaves are a rich mid-green.

BINKUANG *(Pachyrhizus erosus)*.

Also called yam bean, potato bean (S. America) and Jicama (Mexico). Seed sometimes sold under the scurrilous name of Mexican water chestnut.

A climbing member of the bean family *(Leguminosae)*. Beans, pods and leaves are quite poisonous, but the tuber, the size of a large swede turnip, is not only edible but delicious eaten as a fruit or a raw or cooked vegetable.

Seeds have short viability, so those sold by major seed merchants are unlikely to grow. Requires tall support for production of seed. Pick off seeds and flowers to encourage larger tubers. Needs plenty of water, heat and organic material in the soil.

BITTER MELON *(Momordica charantia)*.

Also called bitter cucumber or fukua.

Annual vine, needs support. Young bitter melons are spliced lengthwise, seeds discarded, washed to remove some bitterness and stir-fried with beef, soy sauce and finely diced ginger. They may also be halved and stuffed with Chinese-style meat mixture. Acquired taste, then almost addictive. Young shoots edible.

BLACK SAPOTE *(Diospyros ebenaster)*.

Hardy tree, native to Mexico, apparently suited to frost-free tablelands and tropical coast. Fruiting at Rosebud Farm, near Kuranda. Called by some chocolate pudding fruit. Fruit 10 cm in diameter, green skin, dark brown soft flesh.

BRAZILIAN CHERRY *(Eugenia uniflora)*.

Known as Surinam cherry in America, but called Brazilian cherry in Queensland, where it has been grown for probably 50 years. Often used as a clipped hedge in Brisbane suburbs, a purpose for which it is well suited. Grows also in Cairns and NT, wild in some places. Fruits are about 3 cm in diameter, like a tiny red pumpkin, sweet, sour and bitter at the same time. Useful for juice, wine, high in ascorbic acid (30 mg per 100 g pulp). Propagate by seed.

BULLOCKS HEART *(Annona reticulata)*.

Long grown in north Queensland and common in the gardens at Hopevale Mission, near Cooktown. The tree is very hardy and bears a heart-shaped fruit about 20 cm long with vividly red skin when it is ripe and white flesh containing about 20 seeds. It resembles the custard-apple in flavour, but the tree grows more rapidly and is subject to fewer pests. Other *Annonas*, including cherimoya, llama and soncoya, are available in north Queensland and are being grown there.

CAPE GOOSEBERRY *(Physalis peruviana)*.

This, and several related plants, bear good little fruit for eating fresh or in pies and jams. The berry is about 2 cm. in diameter, enclosed in an enlarged calyx like a little fairy lantern. A straggly shrub which can be staked to keep berries off the ground away from ants, which love to build nests in the calyx to keep dry in the wet weather. Grown from seed and cuttings. Responsive to rich soil, water and fertilisers.

CAPULIN *(Mutingia calabura)*.

Also called strawberry tree, Panama cherry, Cherry tree (Singapore) and Guasem.

Native of tropical South America and the West Indies, now extensively grown in Singapore. Shallow-rooted, fast growing to 5-8 metres, bears in less than two years, tends to run wild. Fruit about 2 cm diameter, smooth and round, eaten fresh or in cooking or jams. Leaves used for refreshing tea in its native land. Requires ample water to establish and soil rich in humus.

Useful for quick subsistence-style intercrop to protect small slow growing fruit trees, possibly in conjunction with pigeon peas.

CARDAMOM *(Elettaria cardoamomun)*.

A large, elegant plant of the ginger family, grown for its strongly-spiced seeds. The flowering stems grow up from the corns to produce orchid-like flowers followed by pods about 1 cm long containing three rows of blackish seeds. Needs water, shade, copious quantities of humus and rotting leaves and sticks, and good drainage. Usually propagated by division, planted shallowly and tied to a stake until established. A great cooking spice, also nice to chew as a spicy breath sweetener.

If ever a palm was a poem...

BY LEN MULLER

COCONUT *(Cocos nucifera).*

If ever a palm was a poem, it must be the coconut.

Apart from its romance and magic in the moonlight, the coconut has a thousand uses, ranging from the practical to the spiritual.

Nobody is quite sure where the coconut came from, since it seems to have existed in so many tropical areas since the beginning of time. There are a few different kinds in Australia, both dwarf and tall.

Coconuts also vary in nut size, amount of husk, colour, thickness of nut and so on. Coconuts are a carefully controlled import which should be strictly observed owing to the existence of some very bad diseases, including *lethal yellowing,* carried in the embryo and as deadly as the name suggests.

Kelapa gading, the dwarf Malaysian coconut, is of a golden colour and suited to gardens and landscaping where there is not room for the bigger palms. It bears nuts when the trunk is only about 50 cm long and the nuts nearly touch the ground. Ordinary large coconuts are the ones from which copra and other coconut products are made.

Coconut cream

Coconut cream is made by husking the coconut, breaking it open, grating the white flesh, adding warm water and wringing the grated flesh and water through a strong piece of cloth (nylon organza is good) into a container.

The grated coconut is then discarded, but water can be added to it and wrung again for a thinner solution. Coconut graters come in many forms. *Liklik Buk* (see Access 1, EG 22-3, page 137) shows several designs, some of which may be bought in Oriental food or kitchenware shops.

Coconut cream is an essential ingredient in most tropical cuisines and forms good combinations with such things as breadfruit, bananas, green vegetables like amaranthus, taro leaves, basella or even common green beans, taro and tannier, fish, chicken and pork.

It is invariably encountered in any Indonesian restaurant and in numerous Indian curries. Reasonable coconut cream can be made by using two cups of dessicated coconut, two cups hot water, blending it in a blender and then wringing it out.

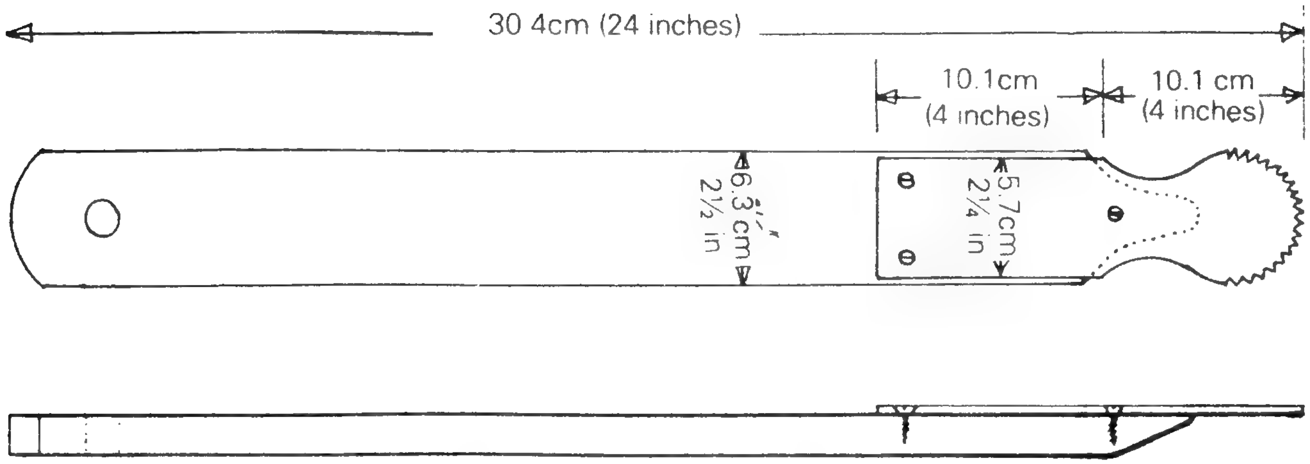
Kokoda

Kokoda is a raw fish recipe from Fiji. Actually the fish is not raw, but 'cooked' by the acid in lime juice.

Take 1 kg fresh firm white fish, skin and bone, cut into small cubes, put into glass or earthenware bowl (not metal), cover with lime or lemon juice (about one cup), cover and chill in refrigerator for three hours.

Drain, add in about 1½-2 cups *thick* coconut cream. Add finely chopped spring onion, 1 clove garlic crushed. Serve in a bowl with a garnish of cucumber cubes, tomato slices and lemon wedges, or in individual chilled glass dishes, suitably garnished.

(Recipe from Lesley Holme, Palm Cove)



COCONUT SCRAPER

The diagram by Heinz Berger shows how a coconut shredder or scraper is put together. The metal shredder at the end is 4 mm (⅛th inch) stainless steel, which is 24 cm (8 in) long and 57 mm (2¼ in) wide.

Marjorie Spear writes: To use the grater, hold the coconut in one hand, moving the scraper inside a half coconut in a circular motion. Sit on a low stool and grate the coconut into a big bowl. They are very good.

RAISING COCONUTS

By Mike and Marilyn Lean

To make the nursery, use flat land. Clear it. Build a fence to keep out pigs. Get the soil ready by digging it well. Make beds about 50 cm (20 ins) apart.

Choose the seed nuts. Pick them only from strong, healthy trees with lots of fruit. The nuts should be smooth and big and have water inside.

Plant the nuts in rows, about 30 cm (12 ins) apart. Almost cover them with soil. Put down a mulch of kunai grass to cover the coconuts. This will keep the ground damp, and stop the weeds from growing. If there is no rain, you should water your coconuts every day.

Three months after planting, pull out all the nuts that are not growing. Also pull out any that are small and weak. Feed them to the pigs. If some are sick, pull them out also. Now you should have left all the young plants that are strong and healthy. They should all be about the same height. Keep your nursery clean by using a hoe to chop all weeds.

Planting out.

Dig holes 2 ft deep and 2 ft wide. Put the topsoil on one side and the subsoil on the other side. Leave the holes open for about 2½ weeks.

When you are ready to start planting the nuts, put some old coconut husks in each hole. You can also put some ashes in each hole. The husks and ashes will rot and help the young plants to grow well.

Cover the husks with the *topsoil* from the hole. Now you can start planting.

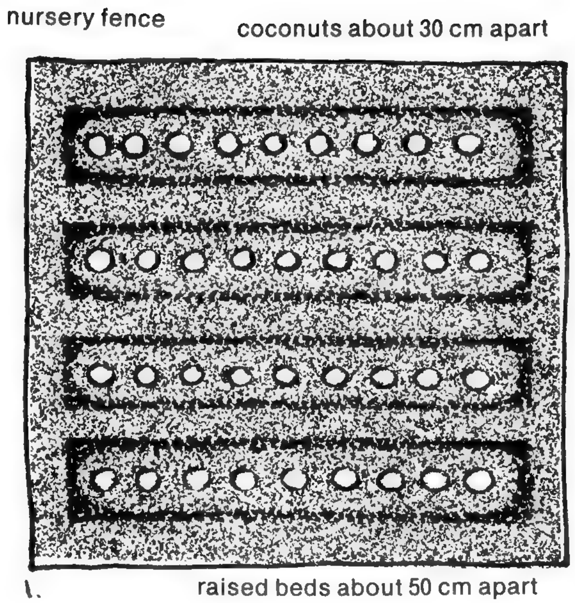
Carefully take the seedling nuts from your nursery. Put each one in a hole. *Do not damage the roots.* Fill in the hole around the coconut with the *subsoil*. The coconut must be a little above the ground, the same as in the nursery. Make the soil *form* around it. Cover the soil around each plant with kunai grass (or other mulch material). This will keep the soil moist and stop weeds growing.

To keep the weeds out of your plantation grow a cover crop.

Soap containers may be made from coconut shells or tin cans, with holes made in the bottom and some wire or string to hang them up as shown here.

Soap will last longer and will be easily found. Have one near where you bath, another near where you wash the dishes and one near where you wash the clothes. A tin container will last longer if it is painted.

Reprinted from *Sangara Skulanka*, Education Department of Papua New Guinea, 1974.



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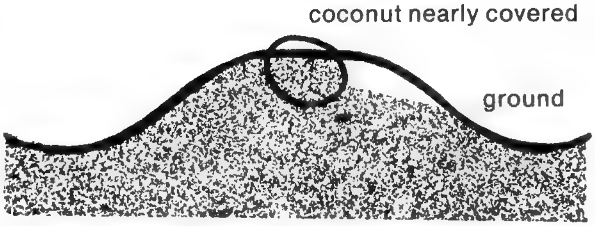

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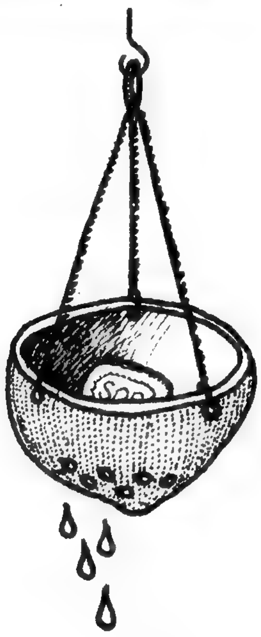
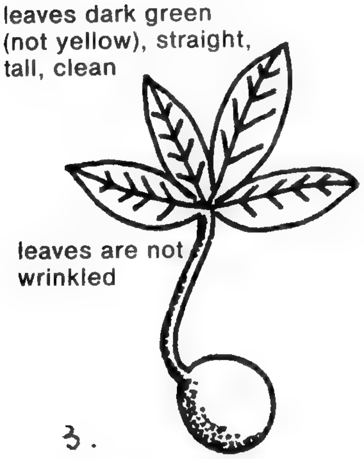
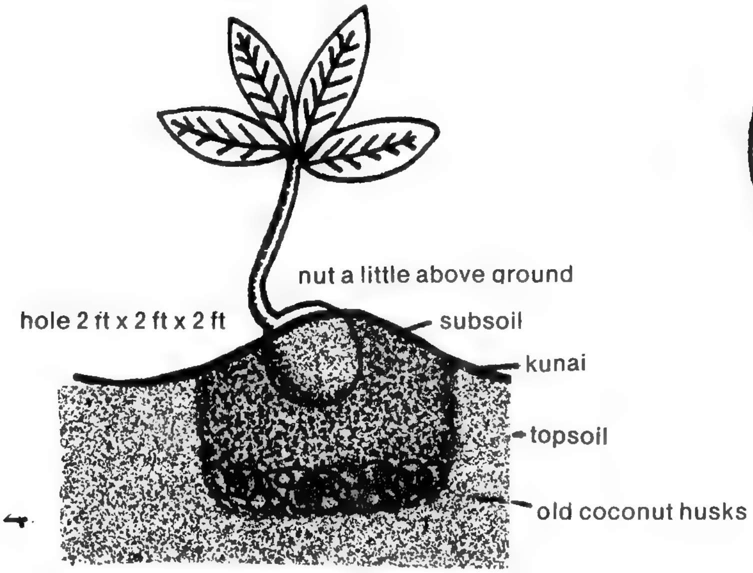


Soap holder


leaves dark green (not yellow), straight, tall, clean
leaves are not wrinkled

3.

healthy seedling

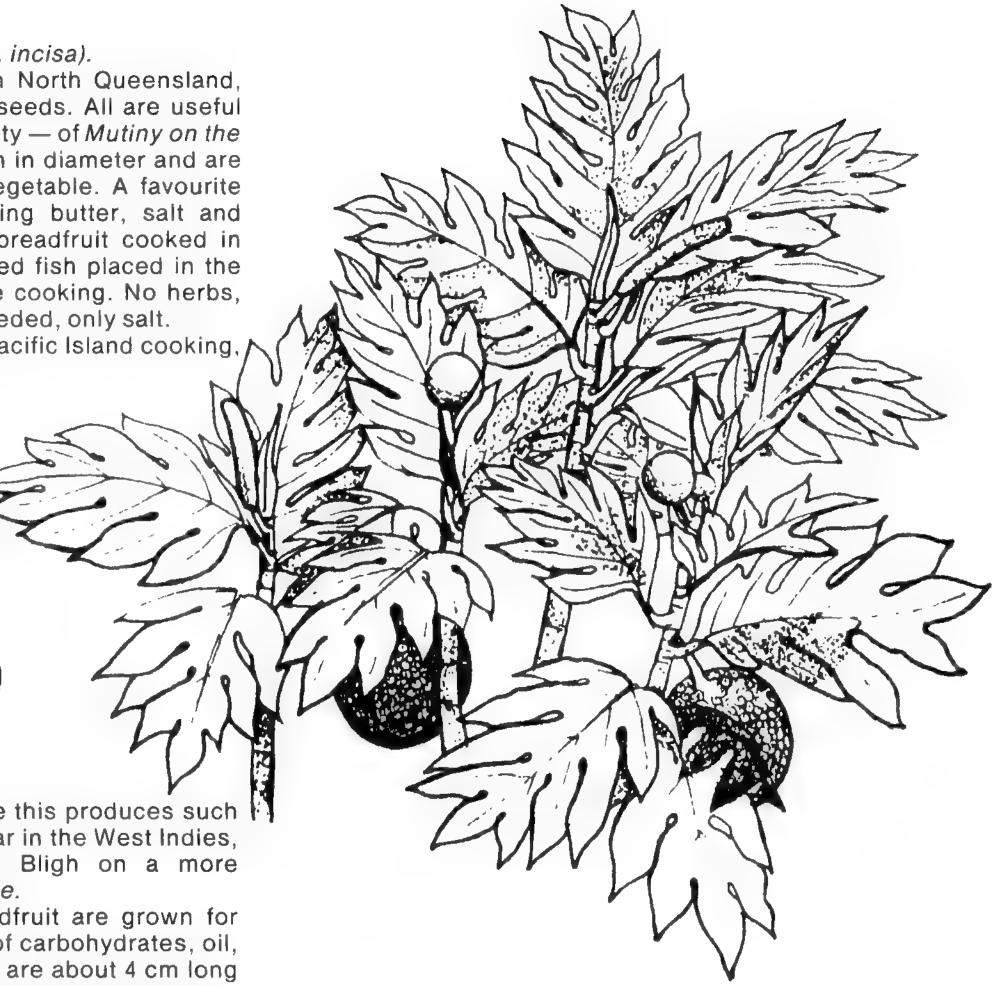


4.

BREADFRUIT *(Artocarpus altilis; A. incisa).*

There are several varieties in North Queensland, some seedless, some with large seeds. All are useful for food. Fruit of the seedless variety — of *Mutiny on the Bounty* fame — may grow to 25 cm in diameter and are used purely as a carbohydrate vegetable. A favourite way is to boil until tender, adding butter, salt and pepper. Another simple dish is breadfruit cooked in coconut cream, with fresh or tinned fish placed in the casserole for the latter part of the cooking. No herbs, spices, or other ingredients are needed, only salt.

Such dishes are the basis of Pacific Island cooking, and is it any wonder that a diet like this produces such handsome people? It is also popular in the West Indies, where it was taken by Captain Bligh on a more successful voyage in the *Providence*.



Seedless breadfruit.

The seeded varieties of breadfruit are grown for their seeds, which are composed of carbohydrates, oil, protein and vitamins. These seeds are about 4 cm long and resemble those of the Jakfruit, and are used in the same way. Slightly immature seeds are easier to peel. They can be roasted, but are somewhat tougher that way. They are better cooked with other vegetables as a casserole, or they can be curried, in your favourite curry mixture. Remember to peel them before cooking, as the seedcoat is tough and unpleasant to eat.

Atrocarpus nobilis, the wild breadfruit of Papua New Guinea, also grows well in Cairns and produces large, edible seeds. The leaves of breadfruit are large and distinctive. They are useful in wrapping food to keep it moist during roasting, and the very young leaves, enclosed in a sheath, may be eaten as a green vegetable, as may other young leaves of the fig and mulberry family.

CASHEW *(Anacardium occidentale).*

The cashew nut of commerce, which requires care in processing because of the corrosive sap under the seedcase, grows on a small bushy tree related to the mango. The nut is surmounted by a fruit which may be red or yellow. The juice of this fruit, which is not very nice raw, when sweetened and cooked, resembles Strawberries Romanoff in flavour, and forms the basis of a sweet sauce to use with ice cream or the filling of a fruit cheese tart.

Processing of the nut can be done at home, but anyone attempting this can't be told too strongly that they must avoid contact with the sap or the fumes given off by the sap when it is heated or burned. The process is described in a summary written by Tom Bell in *Darwin Gardeners Gourmet Guide,* produced by Darwin Garden Club in 1978. This appears to contain sufficient information for a careful person to process the nuts safely.

The young leaves, cooked, are eaten in Indonesia, as are those of the mango. Cashew is one of the few fruit trees which will stand soil which is waterlogged for part of the year. They are subject to attack by termites and dieback of some young shoots sometimes occurs. In general they are hardy and survive a long dry spell. Flying foxes seek out the fruit and distribute the seeds, where they often germinate in the wild.

CASSAVA *(Manihot esculenta).*

There has been much talk about cassava as a fuel source, while tropical people all around the world grow it as a staple food. For some dishes, such as the African *fufu,* or thick cassava 'chips', or *Krupuk* (Indonesian prawn crackers), there is no substitute for cassava.

The tender leaves, cooked thoroughly, may be eaten as greens. They contain high amounts of protein, but do have the drawback that several essential amino acids are practically absent. Most of the cassava grown in Australia (as a common ornamental) is of sweet varieties. These must still be cooked thoroughly to dispel hydrocyanic acid, which is present in all parts of the plant.

Cassava starch is readily digested and hydrolises (breaks down into smaller molecules) very quickly when cooked. That horrifying commercial product, *tapioca,* which I wouldn't eat even if near starvation, is made from cassava which has been hydrolised and dried.

Cassava is readily propagated by cuttings at the beginning of the wet season and given fertiliser and organic material, the tubers are ready in eight months. All of the outside bark of the tubers (the cortex) should be removed and discarded. Thick cassava chips are made from chip shapes cut to about 2 cm thickness, boiled until just tender and then deep fried. They then become light and puffy and can be eaten with salt and pepper, or possibly a dip made like a *satay* sauce, containing oil, browned coconut, sesame seed, peanut butter, garlic and salt and sugar. Cassava chips do lack a specific flavour and need to accompany a flavoursome dish.

CEYLON SPINACH *(Basella alba; B. rubra).*

Also called Basella or Malabar spinach.

Two very similar plants, one with green stems and leaves, the other with red colouration in the stem and veins like rhubarb. A scrambling, fairly succulent plant with 20 cm heart-shaped leaves. Tender shoots and leaves are eaten braised until wilted in a little hot oil. Propagate by seeds or cuttings, which take root in a few days in water. Also used as a soup green and in casseroles.

CHEMPEDAK *(Artocarpus integer).*

Similar to Jakfruit, but the growing tips and leaves are covered in fine black hairs. The leaves are normally oblong. Some Jaks also have oblong leaves, but chempedak is much more hairy. It is also more tropical in its requirements and not easy to grow even in Cairns. It needs plenty of water, good drainage and large quantities of organic material. The shape of the fruit is a large elongated oval and the surface is smoother than Jak. Chempedak/Jak crosses are also cultivated.

CHICORY *(Cichorium intybus).*

Strangely enough, this bitter leaf vegetable, rich in vitamins and minerals, grows like a weed in the tropics. The root, roasted and ground is preferred by some to coffee. For those who like it, it's so easy to grow you'd be mad not to.

CHILLI *(Capsicum annuum var. acuminatum).*
BIRDSEYE CHILLI *(C. frutescens).*
BONNET PEPPER *(C. sinense).*
CAPSICUM or SWEET PEPPERS *(C. annuum var. grossum).*

Many varieties of sweet capsicum, paprika and the fiery chilli types may be grown without serious threat of wilt disease in all areas except where nematodes are bad.

A good combination for a casserole, based on African cooking, is meat, fruit (e.g. ripe and green pawpaw), peanut butter and chilli. Various green leafy vegetables may be added or cooked separately.

CHINESE CABBAGE & KALES

Several species of Asian cabbages are grown and do well from the end of the heavy rain (April) until about September. The cabbage moth can be a real burden, but if the plants are watched carefully, they can be detected and controlled by *Dipel,* specific to grubs and harmless to birds, animals, humans and plants.

Brassica pekinensis — commonly called Chinese cabbage, wombok or Petsai.

Brassica alboglabra — Kailaan kale. Flavour similar to broccoli, but the leaves are also eaten.

Brassica chinensis — Bok choy, a yellow-flowering cabbage with thick white stems. All parts including flowers are eaten.

Brassica juncea — Swatow mustard. Strong and hot, a large, open cabbage, easy to grow.

Chinese cabbages and kales are at their best cooked soon after picking when they are still crisp, braised in a hot pan or wok in a little oil, with the addition of some finely diced ginger, salt and/or soy sauce and the juice thickened with a little cornflour in water. Brief cooking until the green parts are just wilted and the thicker parts just crispy is best. Never use careless cooking methods and large volumes of water when cooking any cabbages unless it's for soup.

Rape, or *Brassica napus,* grows very readily even in the wettest parts of the year. Rape is a good standby food and is used in some parts of China as a salted and dried vegetable for soup, in which it may be combined with chilli. The tender leaves of rape are very good braised with beef. Some *Brassica oleracea* varieties — cabbage, broccoli and possibly Brussels sprouts — may be grown in the tropics if you have the patience and choose exactly the right time to plant them.

CHINESE CHIVES *(Allium tuberosum).*

Also called garlic chives. This member of the onion family is grown instead of garlic and is used in its place. It is a hardy plant with strap-like leaves and white flowers. It is propagated by seed or division. The flowers have a delicate, luxurious flavour, ideal for a herb butter or to sprinkle on fried rice.

In China the leaves are blanched by excluding light and are eaten as a garnish for fried noodles *(chow mein).* For most Australian tastes, the leaves would be clipped off and used like chives. The bulb, which is narrow and cylindrical, is not eaten, but allowed to divide to produce more plants.

CINNAMON *(Cinnamomum zeylanicum).*

An attractive small tree which should be cut back so that many small trunks form as suckers. These are peeled to provide the bark for cinnamon quills. The tree has been grown for home use and ornament for many years in areas north of Townsville. Fresh cinnamon — even the leaves — seems to add just the right flavour to chicken, especially if cooked in coconut cream.

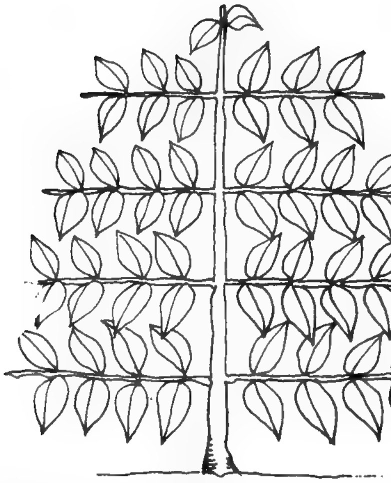
CITRUS

One of the most adaptable of plants, citrus of many species and varieties seem to thrive in countries of various climates. In tropical Australia, they are close to home, which is South East Asia. In some areas grafted trees present a problem owing to the use of unsuitable root stock by nurseries. Seedlings are often better. The calamondin and the Pomelo are gaining popularity in the north, additions to the more common oranges, lemons, limes and grapefruit which have been grown in backyards and orchards for years. Calamondins are good landscaping subjects and make a better drink than any other citrus.

COCOPLUM *(Chrysobalanus icaco).*

A tree which resembles a large shrub, with small white flowers, apparently wild in tropical America and western tropical Africa. The fruit, shaped like a large olive, may be reddish or black when ripe. The plant is easily grown in a variety of soils and temperatures. Though probably not a fruit destined for fame, it is worth growing for variety. Cooked with sugar it is a popular conserve in Cuba and the Bahamas.

During the process, a large needle or ice-pick is driven through the fruit and the seed so that the preserving syrup can penetrate the kernel as well, which is edible after peeling. The seeds may also be roasted as nuts.



COFFEE *(Coffea arabica, C. liberica* also grown).

Coffee cultivation presents no problems where there is ample water and sufficient humidity for the plant to remain healthy. Light shade seems necessary to protect the plants from the strong sun in very dry weather. Good drainage, a regular fertiliser schedule and ample humus are also required.

It is not generally known that in ancient times a beverage was also made from the leaves of coffee, which also contain caffeine. Coffee berries and their seeds were also used as a food. According to Robert Schery in *Plants for Man* (Allen & Unwin), dried coffee leaves are still used to make a beverage in parts of Sumatra today.

Although coffee beans are normally stored and transported and roasted and ground free of the berry, it is possible to roast and grind the whole fruit with the bean enclosed.

Coffee is worth growing for people who have time to care for it and who can manage the drying and roasting. A dozen sample plants should be tried to see how well they do and to see how many you will need altogether to provide you with coffee. It's quite expensive to buy after all.

CORIANDER *(Coriandrum sativum).*

An ancient condiment with many well known uses. Grows in rich soil from May to September. Fresh leaves used for flavouring and the dried seeds may be ground for curries and Indonesian dishes. Seeds easy to dry and store.

CUCUMBERS *(Cucumis sativus).*

Easy to grow at the same time as Dill (May-September).

CURRY LEAVES *(Murraya koenigii).*

A small tree grown for its aromatic leaves, often used in Indian curries and Indonesian dishes. The following recipe gives some idea of quantities to use in cooking.

Fish curry

500 gm boneless fish
2 cups coconut cream
Malaysian curry powder to your preferred strength (1 tablespoon?)
2 sprigs fresh curry leaves *(daun kari)*
1 cup tamarind water
salt to taste
2 tablespoons oil

Combine all ingredients, stir, and cook for 10 minutes after boiling. Serve with white boiled rice, some sliced bananas and a hot sambal (chillies in soy sauce).

sources

Note: Not all of the nurseries listed here will handle mail orders, but some do and will answer your enquiries for unusual tropical food plants or trees. Please send sae when making enquiries.

The best way to obtain stock is to visit a nursery, seek advice, and carry the plants home yourself. Air cargo, road transport and rail services are not always reliable, especially if trans-shipment is involved.

Many trees will not travel well, especially interstate, where they are supposed to go bare rooted. Please consider your own climate if ordering. It's ridiculous for someone in a frosty area to buy breadfruit, to try, for example,

Suppliers

Alan Carle, PO Box 33, Gordonvale, Qld, 4865. Specialist in fruit trees from tropical lowlands, including plants from Philippines, Papua New Guinea, tropical America, Malaysia and Indonesia.

Avondale Nursery, PO Box 30, Smithfield, Qld, 4871 (off Kuranda Range Road). A wide range of rare fruit trees and flavouring plants. Prices from $2.00 to $20.00, depending on rarity and age of plant.

Rosebud Farm, PO Box 45, Kuranda, Qld, 4872. Specialists in fruit trees from Central and South America, but Asian trees also sold, including Balinese Salak.

Kerry Davis, Atherton Native Plant Nursery, 14 Herberton Road, Atherton, Qld, 4883. Specialist in native fruit plants such as the Herbert River Cherry, Davidson's Plum, Burdekin Plum, some Eugenias, and others.

Limberlost Nursery, PO Freshwater, Qld, 4872. Grafted citrus, lychees, avocados and some of the more unusual fruits.

Seeds

Digger's Seeds, 199 Ashworth Street, Albert Park, Vic, 3206, is introducing a range of semi-tropical and perennial plant seeds suitable for use in a permaculture system. These include bananas, coffee arabica, feijoa, jojoba, paw paw, amaranth, peanut, macadamia nut and banana passionfruit.

Digger's Garden Club catalogue, to be issued in July, will have the prices and culture details. Send $2.00 to the above address for a catalogue. Club membership is $5.00 annually and members save 20 per cent on seeds ordered.

New Gippsland Seed Farm, PO Box 1, Silvan, Vic, 3797. Write for a catalogue, which is 28¢ posted. Vegetable seeds include good selections of Chinese cabbages, amaranth (called tampala) and a wide range of temperate zone vegetable seeds.

Rare Fruit Council of Australia, PO Box 707, Cairns, Qld, 4870. Not a nursery or supplier of plants, but will help you find a source of supply for fruit plants you may be having difficulty in obtaining. Subscription of $10.00 yearly includes a newsletter in which members may advertise free for seeds and plants.

Len Muller, PO Box 19, Trinity Beach, Qld, 4871. Not a nursery, but willing to exchange seeds and cuttings, or help locate sources of supply.

PLANT PROTEIN

By **KEITH VINCENT SMITH**

When you plant beans and peas you are planting protein.

These legumes provide a good, cheap source of vegetable protein, equal to and sometimes more than the amount of protein in meat and grains.

Protein is important for human nutrition because it builds up our bodies and restores and repairs muscle tissue. Protein helps us grow, so children require as much, or more, intake of protein than adults.

Of course, in Australia today, there is little danger that anybody is suffering from protein *deficiency.* Rather it is the reverse. We eat *too much* protein, usually in the form of meat, fish, eggs, milk and cheese.

In the "lucky country" we have been conditioned to think primarily of meat as the main source of protein. But all our protein needs can be supplied purely from vegetables, notably from legumes, but also from nuts, seeds and leafy greens.

Meat costs two to three times more than most types of peas and beans and the price of fish, eggs, milk and cheese is constantly increasing. If we plant a range of legumes we will be able to eat better, with less meat, eat fresher food — and more cheaply too!

Legumes and other vegetables will play an important part in our survival into the 21st century. Already our dietary patterns are changing due partly to the high cost of lamb and beef, the traditional meat dishes, and also to a change in our outlook on life. It is likely that in the future we will be eating more vegetables and less meat. One shift in food preference showed up in official figures for the first time in 1979. This was the year in which more Australians ate slightly more white meat (poultry) than red meat (beef and lamb) for the first time.

Legumes are easy to grow and there are types adapted to every climate from the tropics, through mild, to cool temperature areas. Many legumes grow root nodules which "fix" nitrogen into the soil, giving a boost to any organic food garden.

They are good sources of calcium, iron, vitamin B1 (thiamine) and niacin. Vitamin C is produced and vitamin and protein content of dried peas and beans is increased when they are sprouted. Legumes store well (except for soybeans and peanuts) and the dried seeds will keep for several years.

If you grow your own legumes you will find that they are good tucker, especially tasty when picked fresh from the garden when at their peak, which in snowpeas and cowpeas, for instance, is when they are about half grown and still immature. Try some of the recipes we've included here if you don't believe this.

Other types are best, like French or kidney beans, when still in the pod, eaten as "snap" beans, still others are preferred as dried beans or peas which have been left to dry in the late summer sunshine. The leaves and shoots of some of the beans listed here are eaten as vegetables (or pot-herbs) and in some the tubers are eaten like yams or sweet potatoes.

If you look at the table of *nutritional value of legumes* you will see that the protein content of the 16 or so beans and peas included in these plant profiles ranges from roughly 19 per cent to an average of 24 per cent and a high rating of 36 per cent for winged bean and 34 to 50 per cent for soybeans.

Amino Acids

It is important to understand what protein is and to realise that there are different kinds of large protein molecules built-up from various kinds and amounts of *amino acids*.To build body protein we need about 22 amino acids, in correct balance.

Some of these are manufactured naturally in our bodies. Eight, which are called essential amino acids, we cannot synthesise in our body tissue and we must obtain these from our food. As our bodies cannot store these, we must eat them, more or less daily.

No living thing can exist without proteins. They are the "building blocks" of all plant and animal cells. Plants make their own food, composed of proteins and sugars, from the sun, water, carbon dioxide, salts and the atmosphere in the presence of chlorophyll in their leaves.

Animals must obtain their food by eating plants or *other* animals. Some common proteins are *albumen,* from egg white, *keratin*, from hair, *collagen*, from leather and *gelatin* from *collagen*. Skin, hair, fingernails, muscle and blood are all rich in protein.

We must also obtain a balance of the essential amino acids because the value of all of them is reduced if even one is not present in a sufficient amount.

These amino acids are considered essential: *isoleucine*, *leucine*, *lysine*, *valine*, *methionine*, *phenylalanine*, *threonine* and *tryptophan*. *Arginine* and *histidine* are essential for the growth of infants, though not necessary in the adult diet.

Different proteins result from varying arrangements of amino acids in complex "chains" or "ladders" spiralling and twisting, combining and rearranging themselves in myriads of permutations of which the end result is our ability to grow, live and reproduce — and to perpetuate the human race.

To balance the amino acids in our diet and so take in the right quality of protein we should use complementary protein balancing as explained by Frances Moore Lappe in *Diet for a Small Planet.* This is a fascinating book, well worth studying.

NUTRITIONAL VALUE OF LEGUMES

Chemical composition of pulses expressed as a percentage per 100 grams in dried state (unless otherwise stated).

Legume	Protein	Fat	Carbohydrate
Adzuki bean	21-23	0.3	65
Broad bean	25.4	1.5	48.5
" raw	8.4		
Chickpea	20.5	4.8	61.0
Cowpea	24.6	0.7	55.7
Gram, black	23.4	1.0	57.3
Haricot bean	22.0	1.5	64.2
" boiled	6.6		
Jack bean or sword bean	23.4	1.2	55.3
Kidney bean	22.0	1.6	57.8
Lablab bean	24.9	0.8	60.1
Lentil	24.1	1.1	61.7
" boiled	7.8		
Lima or butter bean	20.7	1.3	57.3
" boiled	8.2		
Mung bean or green gram	23.6	1.2	58.2
" sprouted	3.8		
Pea, garden	22.5	1.0	58.5
" boiled	5.4		
Peanut	30.4	47.7	11.7
" roasted	26.0		
Pigeon pea	19.2	1.5	57.3
" dhal (split)	23.4	1.7	57.2
Soybean	34-50	13-24	14-24
" fresh	10.9		
" full fat flour	40.4		
" boiled	7.8		
Soy sauce	5-6		
" tofu (depends on moisture)	6-17		
Tepary bean	22.2	1.4	59.3
Winged bean	36.0	15.0	35.0
" 'tubers'	20.0		
" shoots	25.0	23.5	13.3

The table is based on a number of sources, notably from *Tropical Crops,* Dicotyledons 1 & 2, by J. W. Purseglove (Longmans) and from *Tabulated information on tropical and sub-tropical grain legumes,* published by the F.A.O. in 1959. The percentages of moisture, fibre and ash are not included in the analysis.

Beans are strong in *lysine*, weaker in *tryptophan* and *isoleucine* and lowest in the sulphur containing amino acids. Grains, seeds and nuts balance this out with higher percentage contents of the amino acids which are deficient in legumes. In combination, the grains and legumes become complete proteins.

It is common sense to eat a varied diet, just as it is to grow a mixture of plants in our small holdings.

Long before our nutritional needs were fully understood many races and cultures of the past seem to have developed an instinctive knowledge of the correct dietary balance for their physical needs.

The Australian Aborigines used a wide range of foods, eating nuts, leaves, roots, grass seeds, berries, insects like the Bogong moth, reptiles, animals, eggs, fish, molluscs and fruit.

In the Aztec and Mayan civilisations no animals were kept for meat, maize and curcubits were the stable crops, but kidney beans, with a protein content of 22 per cent, were grown to supplement the corn which was low in protein.

Legumes were the subsistence crop in countries with dense populations, like India, where religious beliefs restricted the sources of meat protein and where the sacred cow gave only dairy products.

In China, pork provided a bulk of protein, supplemented by fish, ducks and fowl. Soybeans replaced meat and dairy products as food in some areas (and for Buddhists) providing protein. Methods of processing soybeans in Asia have yielded palatable foods like *tofu*. The amino acid *lysine* which is low in rice, was provided by fish, soybeans, bean sprouts and other legumes.

In Australia we have inherited predominantly British food habits, folklore and taboos, likes and dislikes. Like the industrial European countries, Australians and New Zealanders eat only 3-7 gms of legumes daily. This may be compared with the amount (in gms) eaten daily in other countries: Brazil — 68, Mexico — 52, Paraguay — 44, Uganda — 100, Indians of Arizona and Mexico — 70, Japan — 50.

By the way, we are *not* advocating any of these legumes as "miracle" plants or "magic" beans. This would be absurd. We want to encourage more growing and eating of this wide variety of vegetable plants and hope they will be regarded one day as part of our plant food resources.

Warnings and drawbacks

We have to say that *flatulence* — gas or wind if you like — is often a problem with peas and beans. It is thought to be caused by carbohydrates from the plants which are not digested by enzymes in the human gut, the resulting gas being caused when they are digested by gut *flora*.

A suggested counter to this is, once again, the eating of a *mixture* of foods and cooking legumes with other foods.

Protein is less in older, stored legumes. Vitamin B1 is partly lost from legumes in cooking.

All raw peas and beans contain *glycosides*, *alkaloids* and other substances which make them mildly poisonous. It is just as well to soak all kinds of dried and raw beans in water and to change the water before cooking them. It is wise to cook sprouted legumes lightly. See the individual listings.

Plant profiles

ADZUKI BEAN *(Phaseolus angularis).*

Also called: Azuki, asuki and aduki beans and Red beans (in China). Adzuki beans have a rich flavour and high protein value (21-23% dry weight). They are easy to sprout and may be prepared for eating in the same way as soybeans or mung beans.

Origin: Japan. They have been grown for centuries in China.

Climate: Fairly drought-resistant and will stand high temperatures but don't like waterlogging. They are worth trying in arid areas and are a short-day plant. A similar climate to soybeans is required.

Maturity: Seeds are ready to eat 3-5 months after planting; bean sprouts in 4-5 days.

Description: A bushy annual, not unlike soybean, reaching 25-75 cm in height. Bright yellow flowers, cylindrical, long, narrow pods grow 6-12 cm, with 5-10 tiny, oblong, red-brown, black or maroon seeds.

Growing: As for soybeans. In Japan, where adzuki beans are the most important crop after soybeans, they are grown in rotation with rice. Dry well and store in glass jars.

Preparation: In China and Japan the dried seeds are eaten boiled or made into a meal or paste which is used in cakes or soups. They are sprouted and sometimes cooked as whole pods when immature. Good combined with rice (cook together 1½ cups rice and ½ cup adzuki beans), or use them in soy and mung bean recipes. To soften the beans, add a piece of *kombu* (Japanese seaweed) at the start of cooking.

Seeds: The seeds are sold in stores in Chinatown, where they are called 'red beans'. Buy them there for sprouting, cooking or planting. Wash thoroughly and soak before cooking.

BROAD BEAN *(Vicia faba).*

Also called: Field bean, Faba or Fava bean, Horse bean, Windsor bean, Shell bean.

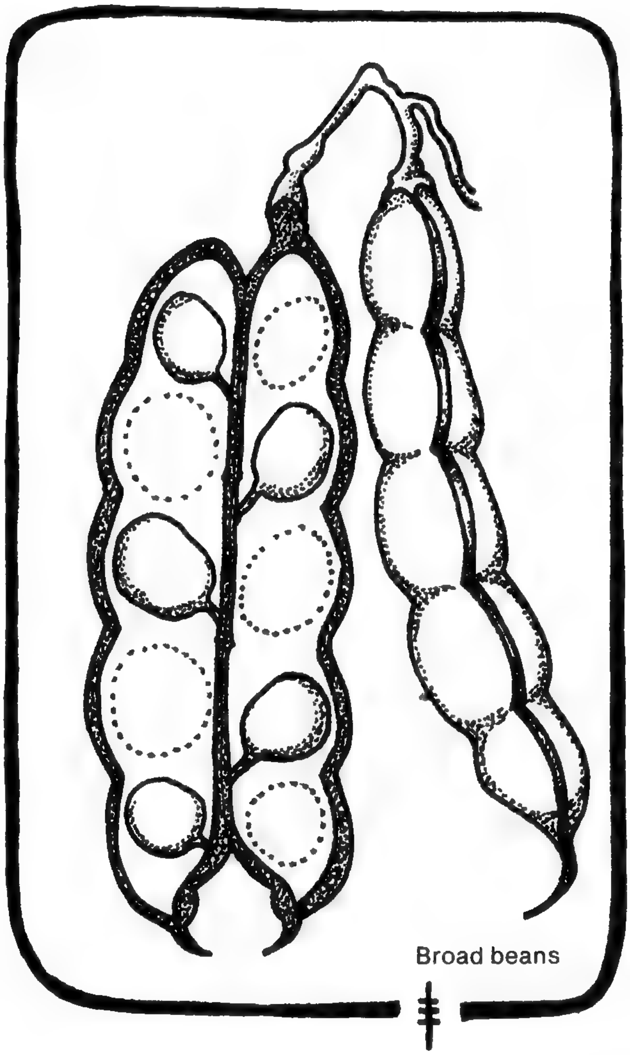
Broad beans have provided vegetable protein for people living in cool places since the earliest times. They contain vitamins A, B and C and are almost as rich in carbohydrates as parsnips. The large pods are easily picked from the erect plant. This is another legume which has a much better flavour when freshly picked from the garden than it does if bought, even a day or so old, from a store.

Origin: Possibly Iran (Persia), spreading out through the Mediterranean and North Africa and to India and China. Grown in Egypt as early as 1800 BC.

Climate: Cool. May be grown at high altitudes in some sub-tropical regions. Will withstand mild frosts but do not set properly in hot weather. In mild climates sow in autumn, through to early spring. The earlier autumn planting will beat the blackfly, one of the worst predators of broad beans.

Maturity: Variable. Should be ready to eat in 20 weeks after sowing. Needs a 90 day cool period.

Description: The broad bean is a hardy annual, growing erect to one metre on a strong stem, or one or two stems, with white or purplish blossoms which have a black 'spot' in the centre. The round green pods contain 5-7 large flat seeds which look like lima beans.



Broad beans

Growing: Plant in rows, or in a 'block' planting, leaving at least 8-10 cm between each seedling. Soil for planting broad beans needs to contain potash or they will suffer from chocolate spot fungus, so add wood ash, well rotted compost, or dig in wilted comfrey to provide this. Branches may be supported by stakes and string. *Longpod* types are usually planted in the autumn in the northern hemisphere and the *Windsor* types in spring. The latter have larger, fewer seeds, with more flavour.

Pick off the leafy tops (you can eat them as a green pot-herb) to deter blackfly, the scourge of broad beans.

Preparation: When extremely young and tender the whole immature pods may be cut up and eaten, steamed, simmered or stir-fried. The lower pods are the first to mature and should be picked as soon as they are 6-8 cm long. Keep the pods picked regularly to promote new growth. The large seeds are delicious with melted butter and finely chopped parsley. In North Africa we ate them stir-fried with garlic added for flavour which gave them a very meaty savour.

The older seeds were traditionally ground into a meal which in the Middle Ages and Tudor times was used to make an inferior bread. The flour may be added to grain flour in small quantities. Dry the seeds in their pods for keeping and eating later in dishes as you would lima beans, but remember to remove the outer skin before cooking.

Warning: Italians and other people of Mediterranean descent, usually men, often suffer from a hereditary allergy when they inhale fava pollen or eat the seeds raw, which they are fond of doing. This is called *favism.*

Broad beans are also linked with *lathyrism,* a muscular weakness caused by toxins in the vetch family, which may also cause paralysis. It is best to eat broad beans in moderation, soak the seeds and change the cooking water (or stop eating them altogether) if you feel symptoms like this.

Seeds: Many types of broad bean seeds are generally available.

Garden ciche (chick-peas), from Gerard's Herball, 1579.

CHICK-PEA *(Cicer arietinum).*

Also called: Garbanzos, garbanzo 'beans', Bengal gram, Chana dhal.

Chick-peas are an important pulse in the area from India west through the Middle East to the Mediterranean countries. It is traditionally used as a split pea, for dhal, in India, for falafel and hommous in the Moslem countries and is sprouted to bring out the distinctive, nutty taste.

Origin: Probably native to west Asia. Grown in Ancient Greece and Egypt.

Climate: Not for the wet tropics, chick-peas need cool nights with dew, prefer a cool, dry climate, but will tolerate dry conditions. In India, Asia and warmer parts of Australia it is grown as a winter crop and in temperate climates as a spring to summer crop.

Maturity: Ready to eat four to seven months after planting; 5-6 days as sprouted seeds.

Description: A spreading annual legume, which grows 25-50 cm tall with small, feathery branching and bushy leaflets which contain oxalic acid (don't eat). The swollen, hairy green pods are 2-3 cm long, plump and beaked, each containing one or two seeds which are wrinkled, angular, like small peas and are yellow, brown or reddish in colour. A variety called *Kabuli gram* has larger white seeds.

Growing: In commercial growing in Queensland, plants are inoculated with a special chickpea inoculum. Soil should be well drained and kept clean of weeds.

Preparation: Sprouted chick-peas are delicious in all the many ways pea and bean sprouts may be used, especially in salads. In India, chick-peas are usually split in a mill and separated from the husks to make dhal, or parched (roasted) and eaten with oil or the dried or parched peas are ground into a flour, *besan,* which is used to make chappaties or sweet cakes. Chick-pea flour is used in *cous-cous* in North Africa. The unripe entire green pods and young shoots are boiled as a vegetable occassionally. Soak seeds before cooking.

Seeds: Available from Lebanese food shops and from health food stores. Chick-peas may also be bought dried or in tins in supermarkets and in three-bean mixes CSIRO had developed *Tyson,* a small brown seed variety for farm crops.

Reference

Chickpeas in Queensland, farm note No F160, Dec 1979, Department of Primary Industries, Queensland.

COWPEAS *(Vigna* species)

There are about 170 species of cowpeas, climbing or erect annual legumes, grown in tropical areas of Africa, Asia and America as a bean vegetable and dried pulse which is high in protein. Some botanists and taxonomists classify the *Vigna* group as of one family, *V. unguivulata,* the wild cowpea of tropical Africa, because all types will cross readily with it.

To prevent confusion, we will break them into separate species, adding *V. sinensis,* the cultivated cowpea of Asia, Malaysia and Africa and *V. sesquipedalis,* the asparagus bean, mostly grown in Asia, Papua New Guinea etc, for its immature pods. Cowpeas are, strictly speaking, neither peas nor beans.

COWPEA *(V. unguiculata).*

Wild or common cowpea, catjung, pea-bean, black-eyed bean or pea.

Origin: Tropical Africa and spread widely through India and SE Asia. Cowpeas came to the Americas on negro slave ships, being used on board to feed the slaves and planted after landing in the West Indies.

These are the black-eyed peas or beans of the southern United States used in 'soul food' recipes. Cowpeas were first cultivated in North Carolina in 1714 and in Virginia in 1775.

Cowpeas are grown as animal fodder and as a human grain legume and pulse and green vegetable (the vine leaves) throughout the tropics and sub-tropics. They are an important source of protein, especially of the amino-acid lysine, in subsistence diets. They should be encouraged to provide balance in the starchy diets of the Pacific and Papua New Guinea.

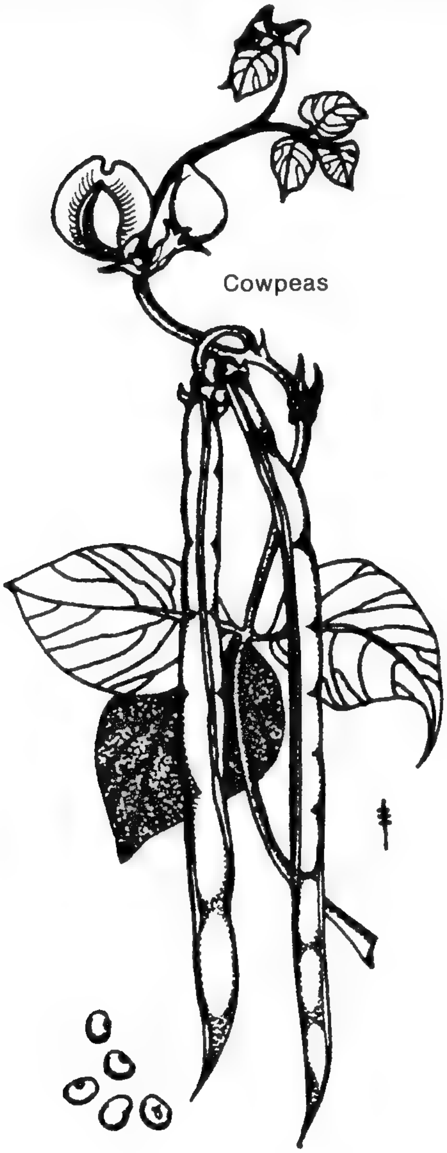
There are erect and trailing forms: the short or 'bush' type is used for 'black-eyed' peas or beans by allowing the seeds to mature on the plant and then drying them; the tall climbers are grown for the young pods (as for asparagus bean).

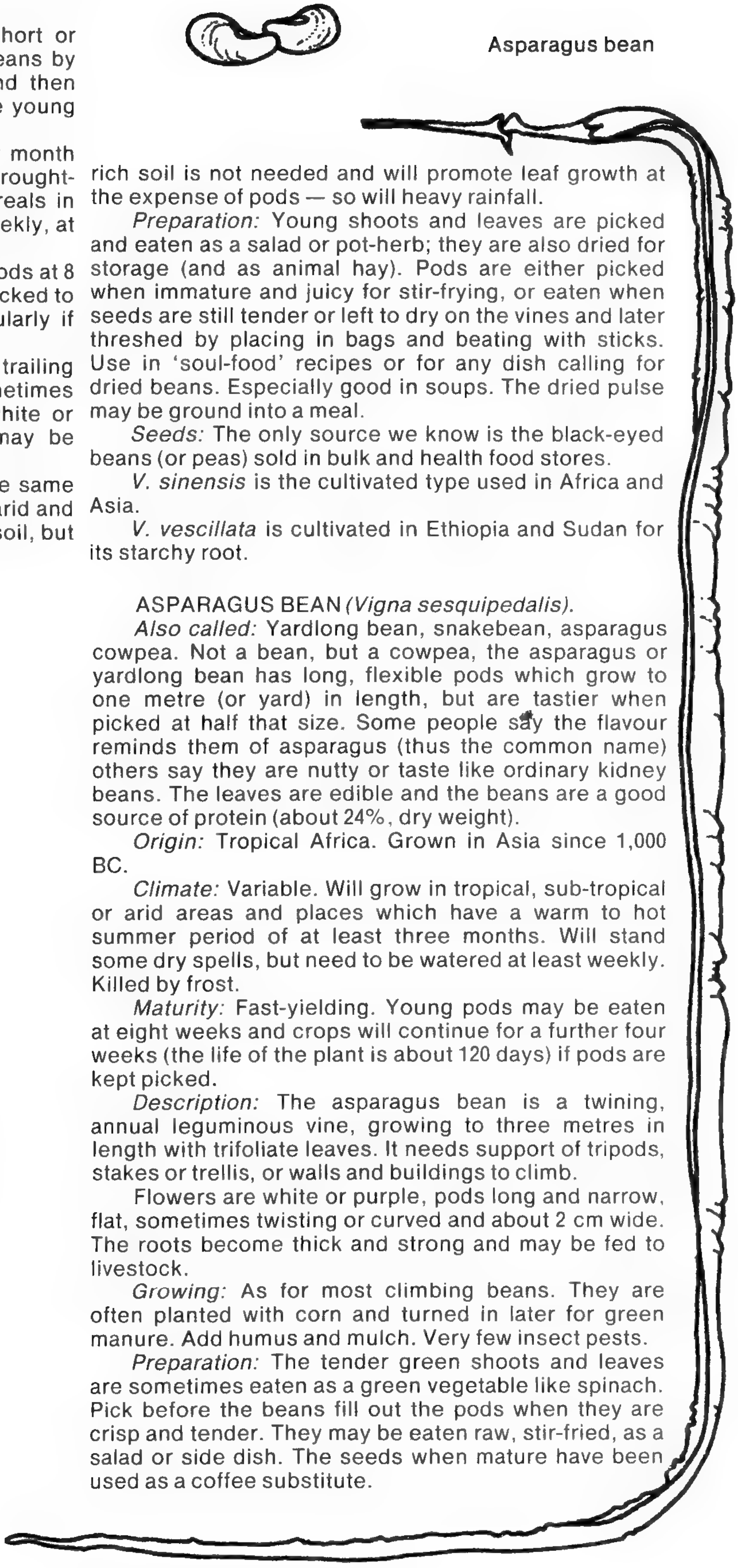
Climate: Wherever there is a three to four month warm summer. The erect types are more drought-resistant. Short-day types are planted with cereals in subsistence cultures and need shade. Water weekly, at least. Killed by frost.

Maturity: Fast growing and yielding edible pods at 8 weeks or dried seed at 2-3 months. Keep pods picked to promote growth or pick vines and leaves regularly if seeking leaf crops.

Description: Spreading, erect, or weakly trailing annual legumes, pods less than 30 cm long, sometimes longer, flat when young. Seeds are usually white or cream with the distinctive black 'eye', but may be brownish. There are 8-12 in each pod.

Growing: As for climbing beans, plant at the same time in mild climates, or throughout the year in arid and sub-tropical areas. Cowpeas need well-drained soil, but rich soil is not needed and will promote leaf growth at the expense of pods — so will heavy rainfall.


Cowpeas


Asparagus bean

Preparation: Young shoots and leaves are picked and eaten as a salad or pot-herb; they are also dried for storage (and as animal hay). Pods are either picked when immature and juicy for stir-frying, or eaten when seeds are still tender or left to dry on the vines and later threshed by placing in bags and beating with sticks. Use in 'soul-food' recipes or for any dish calling for dried beans. Especially good in soups. The dried pulse may be ground into a meal.

Seeds: The only source we know is the black-eyed beans (or peas) sold in bulk and health food stores.

V. sinensis is the cultivated type used in Africa and Asia.

V. vescillata is cultivated in Ethiopia and Sudan for its starchy root.

ASPARAGUS BEAN *(Vigna sesquipedalis).*

Also called: Yardlong bean, snakebean, asparagus cowpea. Not a bean, but a cowpea, the asparagus or yardlong bean has long, flexible pods which grow to one metre (or yard) in length, but are tastier when picked at half that size. Some people say the flavour reminds them of asparagus (thus the common name) others say they are nutty or taste like ordinary kidney beans. The leaves are edible and the beans are a good source of protein (about 24%, dry weight).

Origin: Tropical Africa. Grown in Asia since 1,000 BC.

Climate: Variable. Will grow in tropical, sub-tropical or arid areas and places which have a warm to hot summer period of at least three months. Will stand some dry spells, but need to be watered at least weekly. Killed by frost.

Maturity: Fast-yielding. Young pods may be eaten at eight weeks and crops will continue for a further four weeks (the life of the plant is about 120 days) if pods are kept picked.

Description: The asparagus bean is a twining, annual leguminous vine, growing to three metres in length with trifoliate leaves. It needs support of tripods, stakes or trellis, or walls and buildings to climb.

Flowers are white or purple, pods long and narrow, flat, sometimes twisting or curved and about 2 cm wide. The roots become thick and strong and may be fed to livestock.

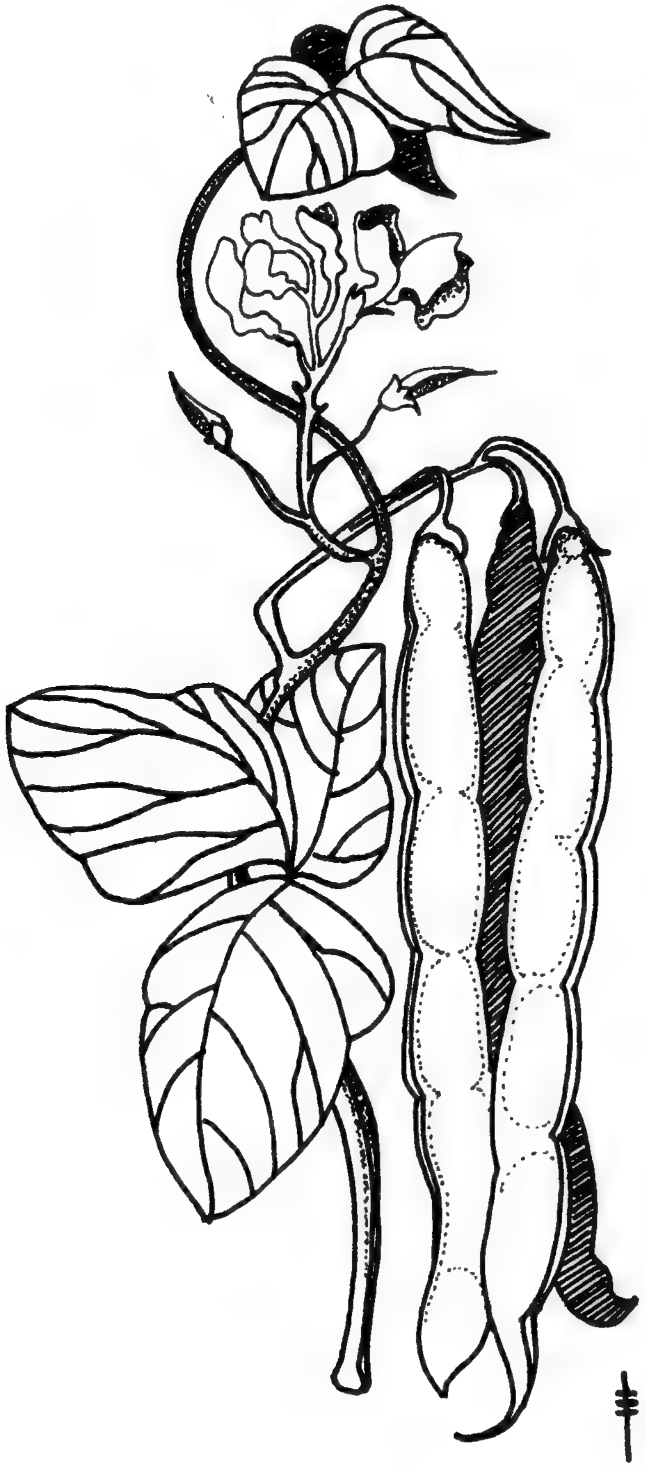
Growing: As for most climbing beans. They are often planted with corn and turned in later for green manure. Add humus and mulch. Very few insect pests.

Preparation: The tender green shoots and leaves are sometimes eaten as a green vegetable like spinach. Pick before the beans fill out the pods when they are crisp and tender. They may be eaten raw, stir-fried, as a salad or side dish. The seeds when mature have been used as a coffee substitute.

FRENCH OR KIDNEY BEANS *(Phaseolus vulgaris,* syn *P. nana)*

Also called: Dwarf or bush beans, snap beans, shell beans (in USA), Haricot beans (France).

Today the most common and popular type of beans we eat in Australia, "French" beans were so called because they were first introduced into Britain from France. They were also called kidney beans because of the shape of the seeds. There are dwarf, climbing and stringless types in amazing variety, including Lima beans (which see). About 1,500 varieties.



Scarlet runner

Origin: The sub-tropical Americas. They have been grown in Mexico for 7,000 years and were brought to Europe by the Spaniards.

Climate: French beans are frost-tender, but will grow from mild through to sub-tropical climates. Sow after frost, as soon as the ground is warm and continue planting at two weekly intervals until late summer.

Maturity: Ready to eat from 8½ weeks from planting, if you are eating them as "snap" (immature pods) beans, or longer for "shell" (dried beans).

Description: Dwarf or bush French beans are annuals in cultivation, growing only 38 cm (15 in) to 61 cm (24 in) high, while climbers may reach 2-3 metres. Pods are either green or yellow in edible pod types and sometimes spotted in "shell" types like *Pinto, Barlotti* and *Cannellini* beans (sometimes called "horticultural" beans). *P. vulgaris* seeds may be white, black, red, ochre and brown, with spots, flecks and stripes.

Genetic breeding has changed the sizes of flowers, numbers of seeds in pods and increased the pod sizes in many types of French beans.

Growing: French beans will grow on a wide range of soils, provided they are well-drained. They do better in a warm, sunny position in soil which has been limed or treated with wood ash and respond to mulching, especially in hot weather. One method of adding potash is to dig trenches and add comfrey leaves before covering with soil and planting bean seeds.

Climbing types need support of a trellis or poles and sometimes bush types will trail on the ground unless a support is provided. Rotate bean crops yearly to prevent disease. Keep the pods picked as needed to prolong the growing season, or leave pods to dry for shell beans.

Preparation: There are plenty of recipes for string beans both new and old. The usual way is to cook in plenty of boiling salted water, drain and serve with melted butter. They may be fried after boiling. Adding bacon, mushrooms and garlic really brings out their true flavour, which is often lost in more complicated recipes. They may also be cut lengthwise, lightly steamed (or stir fried) and added to salads.

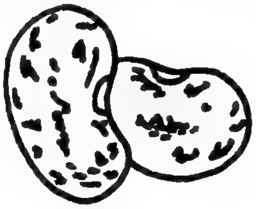
Dried kidney beans are usually added to the pot for soups and casseroles. In Mexico they are crushed and fried after boiling to make *refritos,* which is often a staple food.

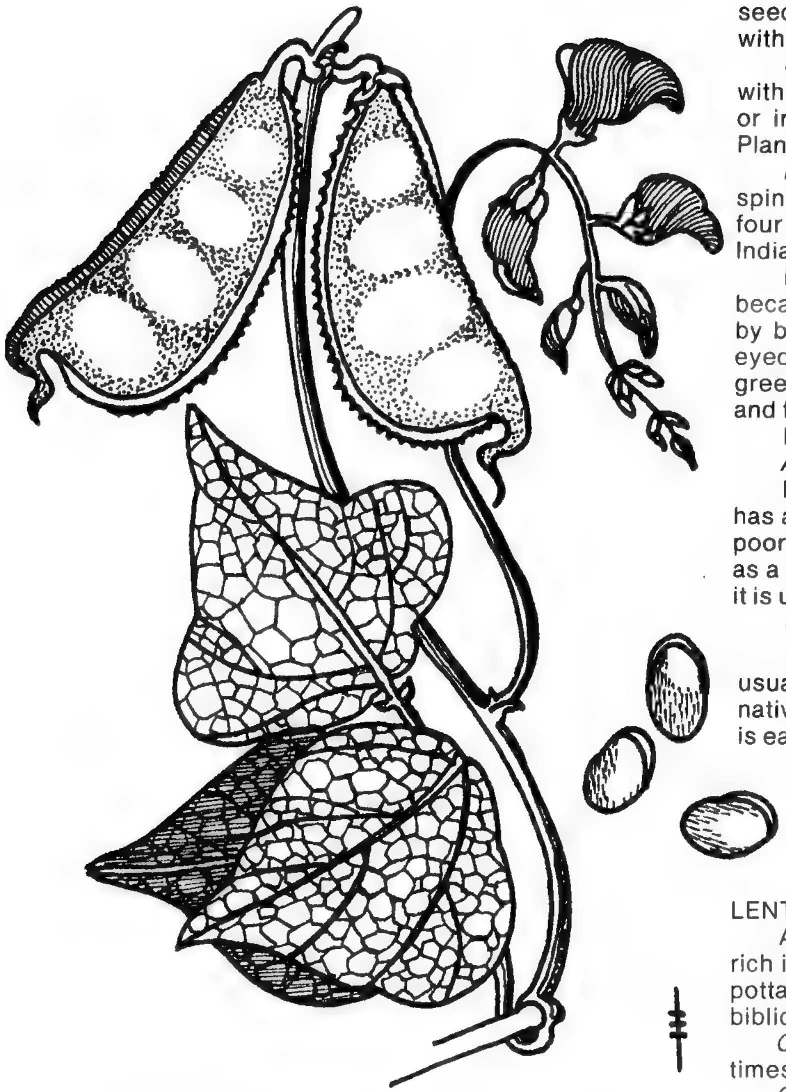
RUNNER BEANS *(P. coccineus* or *P. multiflorus)*

Also called: pole beans, climbing beans, and including the lovely Scarlet Runner.

These are perennials, usually grown as annuals, which reach 4 metres, with pods of 10-30 cm in various colours, like the flowers.

They need support, but otherwise are treated (and eaten) in the same way as French beans. *Westralia* is a rust resistant type suitable for dryer areas.





LABLAB BEAN *(Lablab purpureus,* syn. *L. niger* and *Dolichos lablab).*

Also called: Lubia bean (Arabic), Bonavist (Jamacia), Hyacinth bean, Seim bean, Indian bean and Egyptian bean.

Origin: Probably Asia. Cultivated in India since early times and grown widely, in the Himalayas (to 2000 metres), Asia, Egypt, Sudan, Papua New Guinea and West Indies.

Climate: There are both long and short day types. Lablab is usually grown as a dry land crop, on poor, sandy soils if they are well drained and at high altitudes. Some types will flower only in short days. Summer growing is possible in temperate climates, winter planting in the tropics.

Maturity: Rapid. Pods are ready to eat 3-4 months after planting. Commercial crops yielding 2.5 tonnes per hectare are typical in Queensland 54 days after planting.

Description: Lablab bean is a perennial twining herb, usually treated as an annual. One type is a climber, reaching 1½ metres in height, others are bushy, with shorter pods, sometimes called the Australian pea *(Dolichos lignosus).* Flowers are white, pink or purple, yielding to a variety of pod shapes, mostly broad and flat, pale yellow, often curved, with a curved beak, about 10-15 cm long. Each pod has 3-6 seeds, usually white, brown, reddish, or black mottled, with a prominent white "eye", of varying size.

Growing: Use stakes for climbing support, fertilise with compost or well-rotted manure and water regularly, or irrigate. They will yield again in the second year. Plant among shade plants or intercrop with grains.

Preparation: In Africa lablab leaves are dried as a spinach green. Ripe seeds are cooked as a split pulse, four types of edible varieties being sold in bazaars in India.

Warning: Lablab beans must *not* be eaten raw because of a poisonous glycoside which is destroyed by boiling or other cooking. Use in recipes for black-eyed peas, in Indian and Oriental dishes. Foliage stays green during dry periods and is used for animal fodder and for hay.

HORSEGRAM *(Dolichos uniflorus; D. biflorus).*

Also called: Madras gram.

Native to Australia's northern tropics, this legume has a yellow flower. In southern India it is known as the poor man's pulse, eaten after boiling or fried whole, or as a meal ground from dried seed. In most other places it is used only for animal fodder.

CROWDER PEA

Black-eyed peas, also called crowder peas, are usually *cowpeas.* But the crowder, or black-eyed pea native to the West Indies *(Dolichos sphanenospermus),* is eaten also as a snap bean.

LENTIL *(Lens esculentia; L. culinaris).*

An annual herb of the pea family, lentil is a pulse rich in protein (24% dry weight) and B vitamins. The red pottage for which Esau sold his birthright to Jacob in the biblical story is thought to have been lentils.

Origin. Asia. Lentils have been eaten since ancient times in Egypt, Greece and Asia.

Climate: Lentil thrives at high altitudes only in tropical countries and is not suitable for hot, wet climates. It is a cool season crop, grown in winter in the northern parts of Australia and spring to summer in the south.

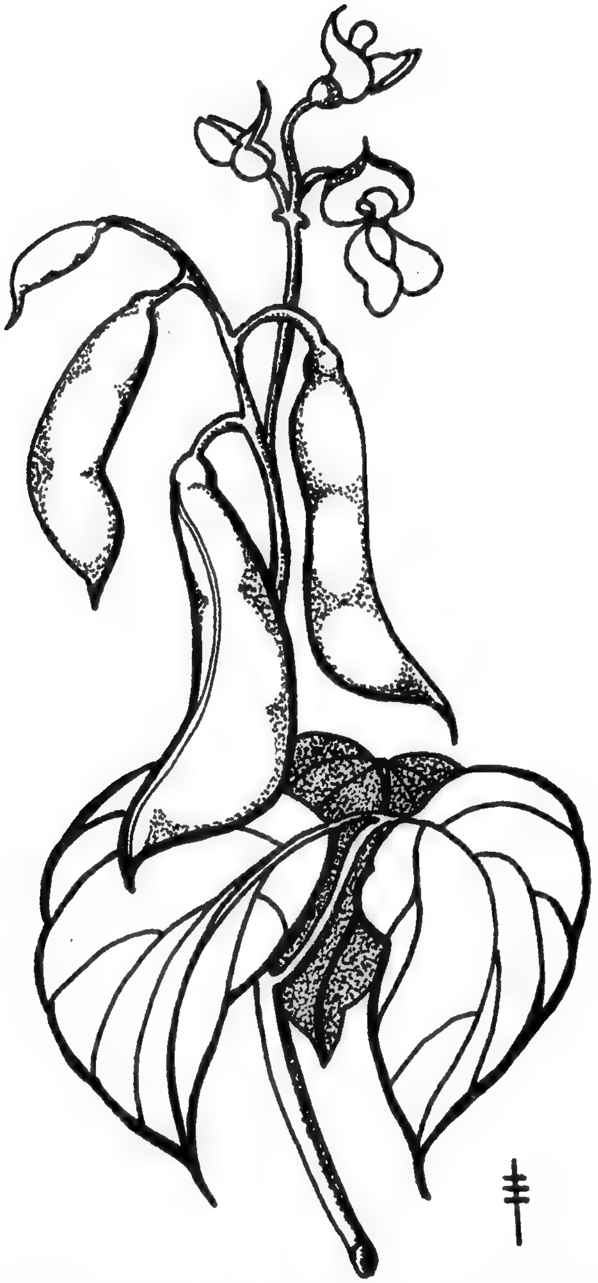
Maturity: Lentils are ready to eat 10 weeks after sowing.

Description: A straggly vine, with slender, angular stems and oval leaflets. White or lavender flowers; oblong, smooth and broad pods each contain 1-2 seeds about 6 mm in diameter which are red, brown, green, yellow, white or mottled in colour. The vine reaches 40 cm.

Growing: Plant in warm, light soil. Culture is similar to peas. Leave seeds to dry in the pods before threshing or shelling.

Preparation: Traditionally, lentils were a protein replacement for meat during Lent in European countries. In India, the split seeds, or dhal, are used in soups, flour from the ground seeds is mixed with rice and other grains and the young pods are eaten as a vegetable. Lentils are also sprouted, steamed as a hot side-dish and used in stews, curries and casseroles. Soak before cooking, or use a pressure cooker.

Seeds: The dried seeds may be sprouted from stock bought at health food shops or bulk stores.



LIMA BEAN *(Phaseolus lunatus,* var. *macrocarpus; P. limensis).*

Also called: Butter bean, Burma bean, Java bean, Madagascar bean, Tongan bean, Sieva bean (small seeded).

These are the broad, flat, white beans usually sold as "butter beans" in grocery stores and supermarkets as a dried pulse which stores well and tastes good too.

Origin: Tropical Central America and South America. Spread from there by the Spanish to the Pacific, Europe, Asia and Africa. Large lima beans have been found in excavations in Peru, dated to 5,000 BC.

Climate: Lima beans are hardy and will grow over a wide range of climates. There are different varieties suited to the tropics (some are shortday plants). They require a growing season which is frost-free and dry weather for maturing the seeds. They will tolerate wet and dry weather spells, so they are worth trying everywhere.

Maturity: Bush types are ready to eat in 80 days, climbers take longer, about 100 days.

Description: The lima bean is a climbing, twining perennial herb, reaching 2-4 metres in length and should be supported by a trellis, poles or other supports. It is treated as an annual in cooler climates and some types (the Sieva bean) are annuals with smaller seeds of various colours.

The bush types are short, erect annuals, 30-90 cm high. Flowers of both types are small and white, pods are oblong, fat and curved, 5-12 cm long and 2.5 cm wide, each with 2-4 seeds which vary in size; flat or rounded and colour; white, red, purple, yellow, brown or black *(see warning).*

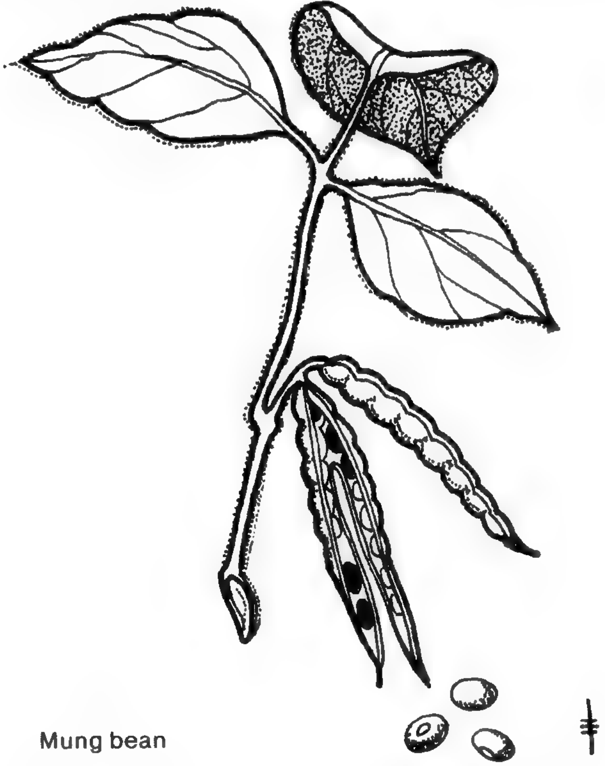
Growing: Both bush and climbing lima beans are quick and prolific yielders, worthwhile growing in the home garden. Treat as usual bush or climbing beans. Leave the pods to ripen on the plant in dry weather if you wish to store them; the pods will begin to split, so the seeds are easy to remove. Store in glass jars.

Lima bean pods when still tender are hard to shell as they don't open readily. You can cut a thin strip all around the pod and pull the two halves apart.

Warning: White lima bean seeds are safe to eat raw, though they are usually boiled and the cooking water changed. This is a precaution against poisonous hydrocyanic acid caused by a glucoside, *phaseo-lunatin,* which is *always* present in the coloured seeds, which must be well washed and soaked before cooking.

Preparation: Prepare for cooking as above. Lima beans have a 'meaty' taste and are delicious in casseroles, stews and soups and as a side dish. It may be dangerous to eat the unripe pods and seeds. Beans are available canned, dried and frozen.

Seeds: Most seedsmen have bush and climbing lima beans, which may be described as butter beans. Once established, you will be able to save your own seed.



Mung bean

MUNG BEAN *(Phaseolus aureus).*

Also called: Green or golden gram and mung dhal (in India), mungo (in Philippines).

Mung beans are the most popular bean for sprouting to eat raw in salads, stir-fried, steamed or combined with other ingredients in a variety of delicious recipes. They are richly nutritious, being 24% protein dry weight and a good source of vitamin C and thiamine (B1) when sprouted.

In India, the shiny hard seeds are used to make *dhal*, a thin gruel or porridge or eaten as split peas.

Origin: Probably native to India.

Climate: Mung beans will grow well in the tropics, arid areas (with sufficient water), and in the temperate to cool climate summers. Sprouts may be produced indoors in any climate.

Maturity: Ready to eat 7-8 weeks after planting; 3-4 days after sprouting.

Description: Mung bean resembles the soybean, with upright, much-branched dark green foliage, 30 cm to 1 metre tall. It is an annual, with purplish or yellow flowers, clusters of hairy pods 5-10 cm long, each with up to 15 seeds which are small, round or oval and green, though there are also brown, golden, and mottled seeds.

Growing: Mung beans do well on most soils, will tolerate dry periods and brief waterlogging. Seeds may be inoculated with the cowpea-peanut strain of rhizobial seed inoculant. Plant in rows, hilled up and cultivate to get rid of weeds. In Australia commercial crops of mung beans are grown under contract to supply seed merchants.

Preparation: Ready to pick when the pods turn dark brown or yellowish. Pods are dried in the sun until ready for threshing, which may be done by placing the pods in a sack and beating with a stick. The beans are often boiled with pork, or mixed with boiled or fried rice. Mung bean sprouts are delicious and crunchy in salads and sandwiches.

Seeds: Available ready for sprouting (or ready sprouted) at health shops and Chinese stores. Plants grow well from sprouts.

BLACK GRAM *(Phaseolus mungo; Vigna mungo).*

Also called: Urd (India) and woolly pyrol (West Indies). A close relative of mung beans, black gram has hairy pods containing 6-10 black seeds with a white "eye". Sometimes used to make a flour for bread or spicy balls or eaten as *dhal*. An annual.

Reference

Mung bean an important new grain crop (Advisory leaflet 1367-1977); *Berken, a new mung bean variety* (1327-1976) from Division of Plant Industries, Department of Primary Industries, Queensland.

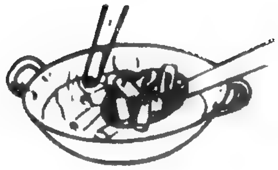
Pauline Green of Corowa, NSW, writes: Mung beans are almost no fail sprouters. I grow these as if ordinary French beans during the summer months.

Warning: Harvest carefully, when pod is brown at tip. This is best done in the evening or morning when there is a slight dampness in the air. In dry weather the pods fly open and half the seeds are lost.

I harvest daily and put my mung bean pods in a cotton bag in the kitchen until they open themselves, or shell them while watching television.

Soybeans are a large plant, one metre high, and need more room than French beans.

WOK COOKING



The *Thai Song Greet* was a cheap hotel above a restaurant in the Chinese section of Bangkok, where I spent a few days in the late '60s. Its guests were a mixture of overland travellers (like me), cyclists on their way to visit the Temple of Angkor Wat (at great risk) in what was then Cambodia and a few deserters from the United States Army in Vietnam.

I was intrigued by the tiled raised walls in the shower recess which were about two feet high. You could fill this up with hot water and take a bath. The hot water was rarely on, but that didn't matter much in Thailand's sticky heat.

But what fascinated me most of all about this seedy establishment was the Chinese cook in the restaurant downstairs. His "kitchen" consisted of two charcoal stoves, each with a wok full of sizzling rice and vegetables. From this he produced a stream of dishes (and appetising smells).

The basic and favourite item was known simply as *fried rice, 5 baht,* the more expensive as *fried rice, 10 baht.* The difference in price was accounted for by the prawns added to the rice, vegetables and bean sprouts of the cheaper dish. The rate of exchange at the time was 30 baht to the U.S. dollar, so you can guess where I did my eating!

This brings us in a roundabout way to stir frying (or sauteing); one of the most effective ways of preparing bean sprouts, sugar peas, green beans and the green pods of most of the legumes mentioned here. It is a quick method, which leaves the flavour and the goodness in the crisp, chopped legumes or leafy greens.

The technique is to heat the wok first, add a small amount of vegetable oil, heat until the oil is thin, then add the ingredients, stirring and tossing continuously with a spatula to stop the food sticking to the side of the pan.

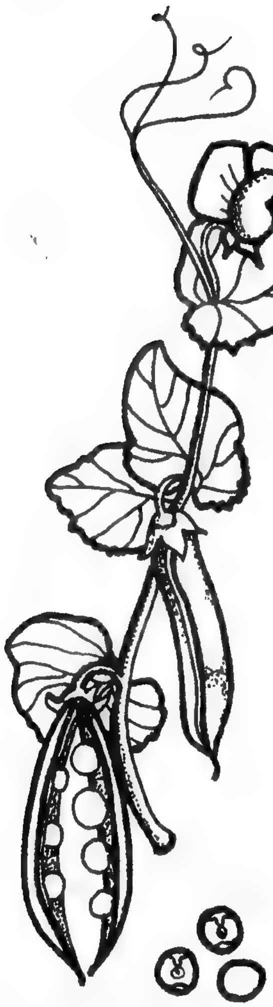
You may add a small amount of water, pouring it down the sides of the wok. This produces steam, but the main idea is for the vegetables to cook, quickly, in their own juice.

A frying pan may be used, but these days you should be able to buy a wok with a round bottom in most kitchen shops, department stores and, of course, Chinese or other Asian shops. A round stand is handy for supporting the wok on stove tops. Electric, plug-in woks are also available. Cast-iron or carbon steel is preferred. Don't buy aluminium.

Stir-fried sprouts and sugar peas

Heat oil in your wok and add, in order, chopped onions, chopped mushrooms, sugar peas and mung bean sprouts. Fry over a rapid heat, continually stirring to prevent burning or sticking. When almost cooked, add a little water, cover the pan and cook for three more minutes. Serve with fried rice.

PEAS



GARDEN PEA *(Pisum sativum,* var. *hortense).*

Also called: Green pea.

Peas are a seed legume, important as a source of protein for humans (though beans contain more protein) and also of vitamins A, B, C, and E. They are grown in the cooler parts of Europe, China, Russia, the United States and Australia and at high altitudes in the tropics and arid areas.

Origin: Western Asia, spreading to India, Africa and Europe, where smooth surfaced carbonised peas have been dated to 7000 BC (the neolithic period).

Climate: Cool weather is essential (though there are some tropical sub-varieties) and the plants are injured by heat. They will not flower in bad frosts. In mild climates, plant in late autumn, late summer and late winter.

Maturity: Pods may be ready to eat within 10 weeks of sowing. Planting may be staggered, using the 'early' and 'late' (main crop) types.

Description: The pea is an annual climbing legume, growing from 50 cm to 150 cm tall, usually compact, with the bush or dwarf varieties *(P. sativum,* var *humile)* reaching 75 cm in height. Plants climb by leafy tendrils, have thready leaflets and white, butterfly-like flowers. Pods are hairless, straight, or slightly curved, 4-15 cm long and 1.5 to 2.5 cm wide with 2-10 seeds in a pod. The fresh garden type seeds may be green, blue-green or yellowish, wrinkled or smooth and have more sugar content than field peas *(P. sativum,* var. *arvense),* which have purple flowers and grey seeds, sometimes spotted.

Growing: Sow seeds thickly in well-drained ground, into which well-rotted manure or compost has been dug in (with lime). It's a good idea to soak peas overnight, or to sprout them before planting, which is best done in dry weather.

Traditionally, peas were planted in trenches about 10 cm deep, which are filled in as the plants come up. All sorts of peas need to be kept off the ground, so provide a trellis, sticks with string, branches, or small-sized wire netting. Feed plants with liquid manure and water regularly.

Preparation: These days the main agricultural crop of peas is grown either for freezing or canning (with artificial colouring additives) as a 'convenience' food for the busy housewife. Dried seeds, or split peas are boiled or used in soup.

Peas may be sprouted, which takes four to five days.

The standard cookery method is to boil young peas and serve with butter and a sprig of mint, a gourmet treat when they are freshly picked from your own garden.

Dried peas should be soaked before cooking. They go well with bacon or pork. Split peas have already had their skins removed and do not require soaking; cooking time is about 45 minutes.

Seeds: All types of peas are available from seedsmen. *Telephone* is a high-yielding climbing variety, reaching 1.75 metres, *Petit pois* are small seeded types which are preferred in Europe, where they are picked very young and tender; grow to 1 m. *Marrowfat,* or wrinkled varieties, are large-seeded, the commercial peas. *White* types are grown for split peas and *Blue* seeded field peas are hardy, bearing round, small seeds.

PIGEON PEA *(Cajanus cajan).*

Also called: Red gram, dhal (in India), Congo pea.

Pigeon pea is the tropical plant recently promoted in Queensland as 'peas on trees'. It is in fact a pea 'bush', a short-lived perennial erect shrub which grows from one to 4 metres high. Grown in Australia mainly to turn in to the soil as a green manure, pigeon pea is a tasty, nutritious pulse (20-25% protein, dry weight) valued in Asia and Africa for thousands of years.

Origin: Probably a native of Africa, and grown in Egypt before 2,000 BC and in India since prehistoric times.

Climate: Adaptable. Drought resistant when established, needing little water because of the deep rooting system, so worth trying in semi-arid areas. Will not tolerate waterlogging and is sensitive to frost.

Maturity: Ready to eat six months after planting, or to 12 months with some varieties. Yields decline after the first year, so the shrub is often grown as an annual. However, bushes may last five years. To preserve them as perennials, cut back regularly and feed with compost and manure.

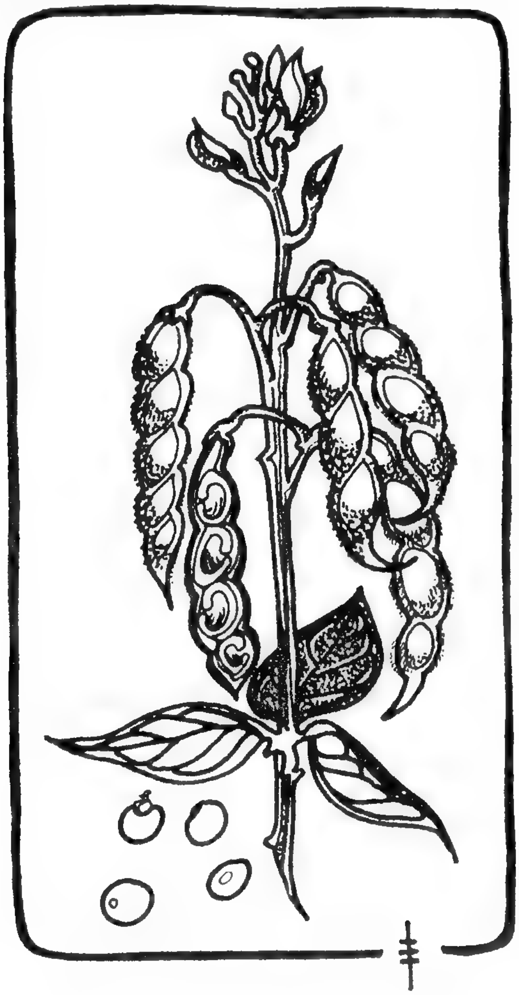
Description: Pigeon peas have thin branches, with narrow hairy stems and trifoliate leaves. Yellow flowers. Dark green or maroon flat pods 4-10 cm long are beaked and hairy and spiral around 3-5 seeds inside. Seeds are red, dark grey or yellow, sometimes speckled and round or oval like small peas.

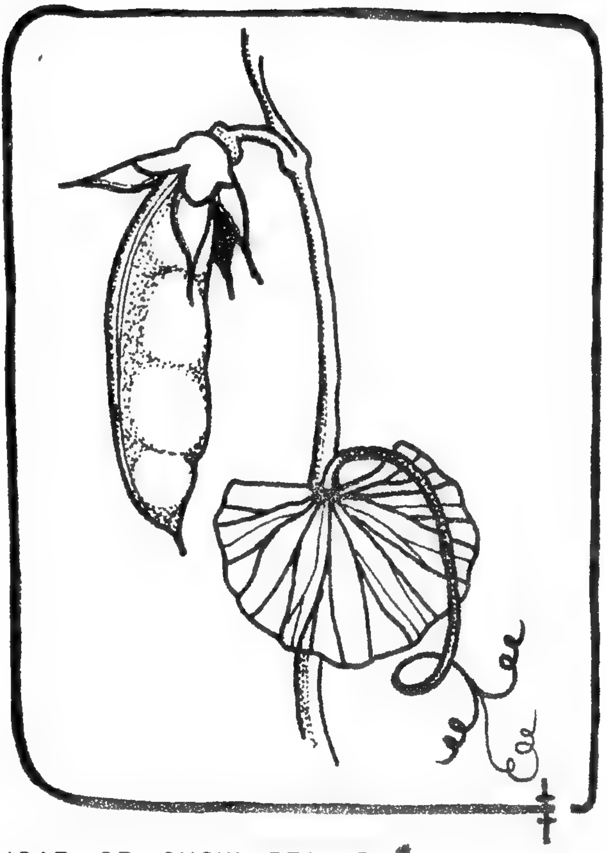
Growing: Propagate by seeds *in situ* or by cuttings when established. Adaptable to soil, but good drainage is essential. Pigeon peas are short-day plants, so plant near shade plants or structures, or protect with roll-back shadecloth. Lime or dolomite may be added to the soil. In his studies of the mycorrhizal association, Sir Albert Howard, the 'father of organic growing' noted in *An Agricultural Testament* (1940) that pigeon pea: "perhaps the most important crop of the Gangetic alluvium," was grown either with millets or with maize. "The mixing of cereals and pulses appears to help both crops", he remarked. "When the two grow together the character of the growth improves. Do the roots of these crops excrete materials useful to each other?" he asked.

Preparation. In India, pigeon pea is used, as a split pea, in *dhal* and soups as are lentils and chickpeas. It is stored, dried, and used much like soybeans. Try them as a substitute in soybean recipes. In the Phillipines, immature pods are steamed and served with butter, pods and all, like sugar peas. Pigeon peas are canned for commercial sale in Trinidad and Puerto Rico.

Fodder: Pigeon pea bushes make excellent browsing for livestock, especially the plant tops and pods and are also made into hay and silage. *Yields* of peas are very high — as much as 1,000 seeds from a single plant!

Seeds: Propagate from dried seed.





SUGAR OR SNOW PEA *(Pisum sativum,* var *macrocarpum).*

Also called: Mange-tout, Chinese pea, sugar pod pea, sugar 'bean' and edible podded pea.

The tender, sweet and crunchy young pods of sugar peas are a treat for the gardening gourmet. They can never be enjoyed the same way from a greengrocer or supermarket because, within a few hours of picking, they toughen and lose their flavour and natural sugars.

Sugar peas are a cool climate crop, fast growing and will withstand some frost once established. They are popular in China, France and the United States.

Origin: a development of the garden pea.

Climate: In temperate areas, snow peas may be planted from early autumn to early spring. In cooler areas, they may be grown from spring through to autumn. Sugar peas *need* cool weather to germinate well. Water in dry spells.

Maturity: Ready to eat at 8-10 weeks from sowing, when the green pods are fully developed and the peas inside are just starting to develop. There is usually a second, smaller crop in a couple of weeks.

Description: An annual legume, sugar peas are available both as climbers with vines reaching two metres and as dwarf varieties which mature two weeks earlier and grow to one metre in height. Use branches, stakes or wire netting to support the plants.

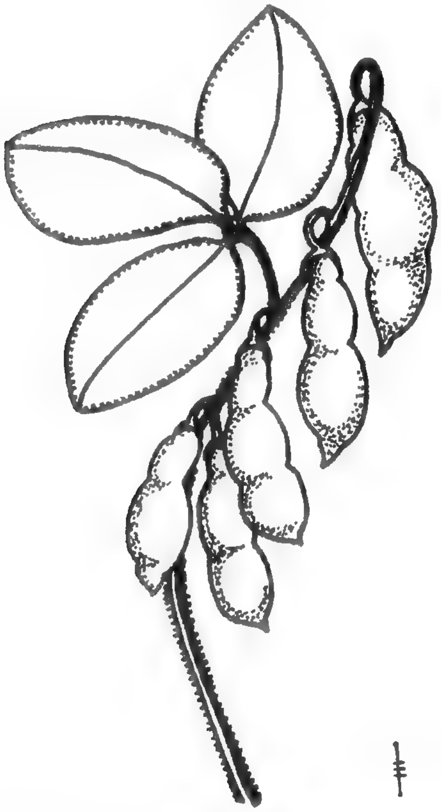
Plants have a beautiful orchid-like white flower, which is sweet smelling. Purple blossom types are climbers, usually imported from Japan and Hong Kong. Foliage and pods are similar to garden peas.

Growing: Soak seeds overnight in water or sprout them before planting. Add compost, lime and wood ash (for potash). Cultivate to control weeds and water regularly. A well-drained soil with plenty of organic matter is best.

Nutrition: Sugar peas are about 5% protein, dry weight. They contain high amounts of vitamins A, E and B and some vitamin C (which is easily lost in cooking). There is more edible tissue than in ordinary garden peas because you eat them pod and all.

Preparation: Pick sugar peas in the cool evening or early morning, just as the pod begins to swell, and cook them while they are still fresh. They should be ideally about half their eventual full size. Snap the pods or cut them into two or three pieces and steam in water until just tender, season and serve with butter, or with soy sauce. They are delicious stir-fried in a wok or as ingredients in many Chinese dishes. You may eat the young pods raw in salads and the mature peas shelled (discard the pod which gets leathery).

Seeds: Sugar peas are available from all seedsmen. This year we've planted Yates *Sugar Snap Peas*, climbers which reach two metres. *Oregon Sugar Pod* is available from Thompson & Morgan and New Gippsland Seed Farm, who also stock *Tall Sugar Pod. Sugar Snap Pea*, *Tall Sugar* and *Bush Sugar* can be bought by mail from Digger's Garden Co Pty Ltd.



SOYBEAN *(Glycine max)*.

Also called: Soja bean, soya bean, vegetable bean.

Origin: Eastern Asia, probably China, where soybeans have been grown for 4800 years.

Vegetarians have already discovered soybeans as a protein replacement for meat because of its excellent balance of all the essential amino acids and the many ways it can be prepared to make tasty meals. Soybeans are an important commercial oilseed crop, being used to make margarine, paint, soap, salad and vegetable oils and a rich meal for livestock and poultry. The average protein content of soybeans is about 40 per cent, with an oil content of 20 per cent. The seeds are eaten whole or split, ground into meal or grits, sprouted, fermented in *tofu* and soy sauce. Young beans may be cooked in the pod as a vegetable or mature beans may be roasted to use as a "nut" like peanuts, or for a coffee substitute.

Maturity: According to the type, from 65 days to 6 months, average about 100 days from planting to maturity.

Climate: Soybeans are a sub-tropical plant, though types have been developed which will grow in cool climates in the summer. The ideal is a hot, wet summer season of at least 100 days. They are short-day plants and some varieties will not set flowers unless there is 10 hours of darkness daily.

Description: There are two main types, an upright, bushy and branching plant with grey hair or fuzz on the stems and pods, which is the most common, and the twisting, leafy, vine type which is usually prostrate. Leaves are hairy also and in groups of three (trifoliate). The tiny flowers may be yellow, brown or black, the hairy pods are usually pale yellow, grey or black, slightly curved, about 5 cm long and contain 2-3 seeds which may be yellow, green, black or brown. A long taproot develops for deep soil feeding and fixes nitrogen in the soil from its nodules. It also makes soybeans tolerant of dry periods.

Growing: Soybeans will adapt to a range of soils, including sandy soil which is not deep and clay which has fair drainage. Plants need moisture immediately after seeds are placed and should be watered regularly after flowering. Lime or dolomite should be worked into the soil. Innoculate seed with *Rhizobium japonicum* (CB1809) to boost germination rate and help the plants fix nitrogen.

Pick fresh seeds for immediate use when they are still green in the pods, before foliage turns yellow. Pick beans for drying when the stems are dead and the pods turn brown, but before the pods shatter. Turn the vine under the soil after harvesting to act as a green manure which returns nitrogen to the soil.

Note: Raw soybeans contain an anti-trypsin factor which inhibits the body's digestion of protein by obstructing enzyme action. They must be cooked (even when sprouted) before eating to destroy this. The quickest way is to pressure cook them for one hour or simmer for two hours after soaking seeds for 24 hours.

Preparation: In general soybeans may be sprouted (but must still be cooked), used fresh when young, either boiled or stir-fried. When dried they are soaked and used in soups, stews, casseroles, made into soybean patties and used in salads.

Soy sauce is made from crushed beans which are boiled, split and fermented. Soy flour or meal is used as a protein additive to grain flours for bread and used to retain moisture in commercially canned food. It is low in carbohydrate and rich in B vitamin. Lecithin is obtained from degummed soy meal.

Soy beans may be roasted in the oven and used like peanuts. Ground soybeans have been used for years as an imitation meat in health food restaurants. It has been "knitted" to imitate the texture of beef steak and is often used as a protein supplement in pet foods.

Tofu (Tahu in Indonesia) is soy curd, made from soybean milk which is curdled by gypsum, seawater, lemon juice or other acid. There are many other Asian products and by-products made from soybeans, a staple food in China, Japan and India

Varieties: In general, black seeded types are richer in protein and lower in oil content and have a distinct "beany" taste. Yellow seeded types have a high oil content and less protein. Black soybean types are sweeter.

Check with the D.P.I. or Department of Agriculture to find the types best suited to your climate and a source of supply.

SWORD BEAN *(Canavolia gladiata)*
Also called: Jack Bean

Sword bean is a large perennial or biennial climber, with claret-coloured seeds, about 8-16 to a pod. Pods are curved, with ridges. Young pods and beans are commonly grown in India and Burma and used as a vegetable. They should be boiled in salted water and the water changed or they are mildly poisonous. High protein content. Suitable for tropical areas.

TEPARY BEAN *(Phaseolus acutifolius).*

This is a quick but low yielding bean suitable for arid, low rainfall areas. It is grown in Mexico and Arizona and eaten as a dried "shell" bean.

Susceptible to frost and too much water. Tepary bean will withstand drought and is a short-day plant. Grows to 25 cm.

Shade trees may be used in arid areas to create "shorter" days and "persuade" legumes that they are in the tropics.

WINGED BEAN *(Psophocarpus tetragonolobus).*

Also called: Goa bean, Manila bean, Princess bean, Four-angled bean and Asparagus 'pea'.

Every part of the winged bean may be eaten and no part is bitter. The seeds are comparable to soybeans in protein content (up to 37% dry weight) and the edible tubers contain five times the protein concentration of cassava, sweet potatoes or yams. Winged bean is widely grown in Melanesia and Papua New Guinea, where it is a subsistence crop. It is grown as an irrigated crop in Burma, Indonesia and other parts of SE Asia.

Origin: Tropical Asia, or West Africa, possibly native to Mauritius or Madagascar.

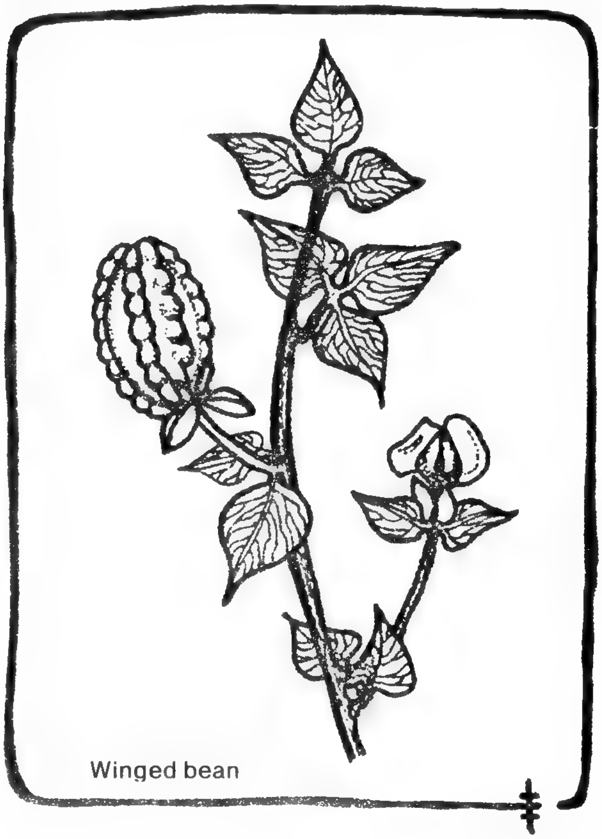
Climate: Winged bean thrives in hot, wet places (the humid tropics) but will not tolerate waterlogging. In Papua New Guinea it is grown in the highlands up to 1,500 metres.

Maturity: Beans are ready to eat 90 days after planting; tubers after six months.

Description: A twining perennial climber, usually treated as an annual. There are two types, those grown for roots and those grown for pods. The vine grows to 3-4 metres in length and needs support of a fence or trellis.

Winged bean is a pretty plant with light green to red foliage and pale blue or purple flowers which are followed by the characteristic 'wings'. Pods are four sided, with a 'fringe' running along the four jagged edges. Pods are 15-30 cm long and 2.5-3 cm wide, each pod containing 8-20 rounded seeds, which vary in colour.

Tubers: The roots are large, heavy and numerous, each plant running 2-3 metres underground in a year. The tubers are encouraged to develop by regular picking of pods and shoots and by regular watering. Yields of one ton of tubers per acre are recorded.



Winged bean

Growing: Tolerant to poor soils, but loamy soils are best. The roots develop nodules abundantly and take up atmospheric nitrogen. Feed with wood ash for potash and mulch well. Plant near shady plants or intercrop with potatoes, sweet corn, squash or other curcubits.

Preparation: The immature stems and shoots and the flowers are eaten raw in salads or cooked like spinach. The young green pods are cut up and eaten like French beans, or cooked whole like snow peas, or steamed until tender (about 10 minutes) and served with butter. They may be stir-fried or used in soups. They are said to taste like asparagus. The ripe seeds are also eaten. In Indonesia the dried seeds are roasted and served with rice. The thick, fleshy tubers have a nutty flavour. They are usually boiled, like potatoes.

Warning: Winged bean seeds must be cooked because they contain an anti-trypsin factor (like soybeans) which makes them hard to digest.

References

The Winged Bean: A High-Protein Crop for the Tropics, booklet, 27 pages. From: Commission on International Relations (JH 215), National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, DC 20418, USA.

Winged Bean, in *Liklik Buk*, Lae, Papua New Guinea, pp. 14-15 (see *Access 1*, EG 22-3, page 137).

The Miracle Bean "A backyard supermarket", in Organic Growers Association WA magazine, Vol. 3, no.1.

Seeds: Members only of the OGAWA may obtain seeds from the seedbank. Membership, which includes the magazine, is $4.00 annually, from PO Box 213, Wembley, WA 6014.

Len Muller writes: Winged bean grows all year in the Cairns area provided it receives some water. The pods are best picked young and not quite fully grown, cut across into bite-sized pieces and braised very quickly in a little oil. Overcooking spoils them and tends to make them limp and a little tough. Mature seeds should always be thoroughly cooked before eating. This is no drawback.

LEGUMES AROUND KURANDA

By Marjorie Spear

Legumes have always been an important source of protein for the island people of the tropics.

Many tropical legumes are adapting well to Australian conditions, but knowledge is not widespread. When I first started growing these here at Kuranda in North Queensland, I was often told names (by people giving me the seed) which I later found out to be wrong by comparing photographs and illustrations from books which I finally acquired.

Most tropical legumes are vines, some taller than others, some ground creepers. The pigeon pea *(Cajanus cajan)* is a notable exception and one that will grow well in dry conditions, though it does want some water. The Queensland Department of Primary Industries is pushing its production in frost-free areas, as there is a big potential for export to Asia, where it is eaten as a dried pea in *dhal.*

The pigeon pea is a shrub which has been grown for years in Australia as a green manure and a windbreak. There are several varieties, but the bigger the pea the easier it is for home harvest. They are easy to grow and, though slow for the first month, produce pods in six months. They are usually planted from October to March. The stubble can also be used as stockfood and the D.P.I. reports no toxicity. I eat pigeon peas when green, raw or cooked.

How to cook tropical legumes correctly is important. Asian people are expert and often Westerners who cook them wrongly find them unpalatable. Basically all legumes when eaten young and green should be cut small, tossed in a little very hot oil or butter, then simmered for a few minutes. This applies to any green spinach, or greens which contain protein. Overcooking in all cases toughens the protein and makes a bitter taste.

The vine legumes include the Madagascar bean (a member of the Lima bean family), which are pink with spots and tasty when dried and cooked.

My favourite legume is the winged bean *(Psophocarpus tetragonolobus)*, so called because jutting from each side of the bean is a wing which runs the length of the bean.

Governments in Indonesia and the Philippines have designated winged bean as a priority research. Scores of researchers in 70 countries are working on the winged bean all over the world. Early in 1978, the Philippines held a winged bean conference attended by 200 delegates from 29 countries.

The green pods, leaves and seeds are rich in proten and vitamins. There are several varieties which will grow to 10 ft or more. Some types have delicious tuberous roots uniquely rich in protein — these are usually left to sprawl on the ground. The seeds are a source of edible oil.

Winged beans grow easily and vigorously, have a very extensive root system and produce nitrogen-fixing nodules on their roots in large numbers. It does not usually need inoculation and will grow in poor soil at altitudes of sea level to 7000 ft in the tropics.

The immature pods are delicious eaten raw or cooked as described. I eat them every day. The plant can tolerate dry conditions if watered, and enjoys humidity. All parts of the winged bean are very high in protein and the dried bean has protein similar to the soybean, but without that bitter taste.

I think the winged bean will supersede the soybean, as with the soy only the bean can be eaten, whereas everything, even the flowers and shoots, of the winged bean can be eaten.

The flowers are white, blue or purple, depending on the variety and are delicious and pretty in salads. It may grow outside the tropics, but short day length is important for the bean to flower. Dr T. N. Khan of the WA Department of Agriculture, South Perth, is having success.

I also grow yams *(Dioscorea* species), many of which I have found very time consuming to harvest and prepare. The yam bean *(Pachyrhizus erosus)* or Binkuang (see Len Muller's story on tropical food plants) is delicious. It is a vigorous legume, growing to 15 ft in rich soil. It may be grown from seed or from tubers. Flowers are beautiful, either white or violet. The brown tubers can be eaten raw or lightly cooked, but only the tubers are safe to eat. *The pods, leaves and seeds are toxic.*

Yams retain their crunchy texture after cooking. They are sometimes called water chestnuts.

In the winter months at Kuranda we can also grow green beans and peas. My favourite is the sugar or snow pea which is now becoming popular.

Legumes are important as a cover crop in my orchard. I have found green *desmodium* grows well from seed, or by digging pieces out and transplanting. It is a perennial.

Lablab bean *(Dolichos lablab)*, an annual, or sometimes a biennial, does well, but I prefer perennials.

Inoculation of legume seed can be necessary if you do not have the necessary bacteria in the soil (if you haven't planted that kind of legume before). If you dig up one plant after it nears maturity, you will know if you need inoculant for the next crop. Perhaps your local Agriculture Department or D.P.I. can advise you? It is important for legumes to have those bacteria, so that they can "fix" nitrogen from the air.

REFERENCES

All these books contain useful information on legumes and other edible plants. Some are more technical than others, so they are ranked with a preference for clarity.

Plants Consumed by Man, B. Brouk, Academic Press, London, 1975, 479 pages. Illustrated with line drawings.

A valuable resource book with plain text and clear figures of plants. Deals with about 300 plants, common-to-unusual, all climates.

Tropical Pulses, J. Smartt, Longmans, London, 1976, 348 pages. Illustrated with line drawings which originally appeared in *Tropical Crops* (see below).

Getting technical, but less use of botanical and scientific terms than Purseglove. Good information on nutrition and protein. Confined to tropical plants.

Tropical Crops, Dicotyledons 1 & 2, J. W. Purseglove, Longmans, London, 1968 (4 vols), reprinted 1977. Clear line drawings.

Rather technical, but packed with information about tropical legumes. J. W. Purseglove was Professor of Pathology at the University of the West Indies in Trinidad and has lived and worked in Asia and Africa. The third and fourth volumes contain information on tropical fruit. Tropical plants only are dealt with.

The Oxford Book of Food Plants, S. G. Harrison, G. B. Masefield & Michael Wallis, Oxford University Press, 1969, 206 pages. Colour illustrations by B. E. Nicholson.

A basic and comprehensive reference work on plants we eat, grouping food plants into groups — fruit, herbs and leafy vegetables and root vegetables. Brief, adequate descriptions cover all climates.

Alternative Foods, a world guide to lesser-known edible plants, James Sholto Douglas, Pelham Books, London, 1978, 177 pages. Some line drawings.

This book covers 1000 food plants in a paragraph or so each and has a good index of common and botanical names. The plants fall into groups which are alternatives to onions, tomatoes, spinach and other greens, grains and fruit. All climates.

Plants That Feed and Serve Us, Else Hvass, Blandford Press, London, 1966, 200 pages. Colour illustrations by E. Hahnewald.

Almost a school textbook, this work first appeared in Danish, was printed in Holland (in English) and has a Swedish copyright! A couple of paragraphs on each plant act as captions to the excellent illustrations of fairly common to not-so-usual economic plants. All climates.

Most of these books are expensive. I read them in the library. Also interesting, but not illustrated, are *A Dictionary of Plants Used by Man,* by George Usher (Constable) and *Sturtevant's Edible Plants of the World,* ed. U. P. Hedrick (Dover), which is a large collection of plants assembled in 1919 by Dr E. Lewis Sturtevant, a botanist who was the director of the New York Agricultural Experimental Station until he retired in 1887.

Over the back fence

CHOKO *(Sechium edule).*
Curcubitacea (gourd family).

Also called: Chayote, choyote (from Aztec, *chayotli),* choco, chu chu, Christophine, quisquil, mirliton, vegetable pear, mango squash and custard marrow.

The choko is an old standby in Australia, (usually seen scrambling over a back fence or backyard shed, neglected and not much cared for by the majority of people. It is more appreciated in the rest of the world as you can see by the wide range of local names it has acquired. You can eat the fruit, young leaves and vine tips and the tuberous root. The choko is worth trying (or trying again) in some of the recipes given here.

Origin: Native to Mexico and Central America.

Climate: Grows best in temperate to warm climates and along the coast as it is sensitive to frost. In hot places, two crops may be harvested in a year.

Maturity: Ready to eat 3-5 months after planting. Usually bear in late summer and autumn.

Description: Choko is a perennial vine, climbing to 12 metres, usually grown as an annual in temperate climates. Leaves resemble squash and pumpkins and the fruit is either round, spherical, or pear shaped, wrinkled or smooth with a pale green or white fruit 4-6 inches long and a large flat seed inside about 1-2 inches long, which is edible.

Growing: Plant vines in spring by allowing the fruit to sprout and placing it at an angle in the soil with the shoot upright. Needs a lot of water, especially when getting established. Needs strong support and will scramble over walls, sheds, fences, trellis or pergola. May be used in temperate areas to protect north-facing walls from excess summer sun as the vines die back during winter.

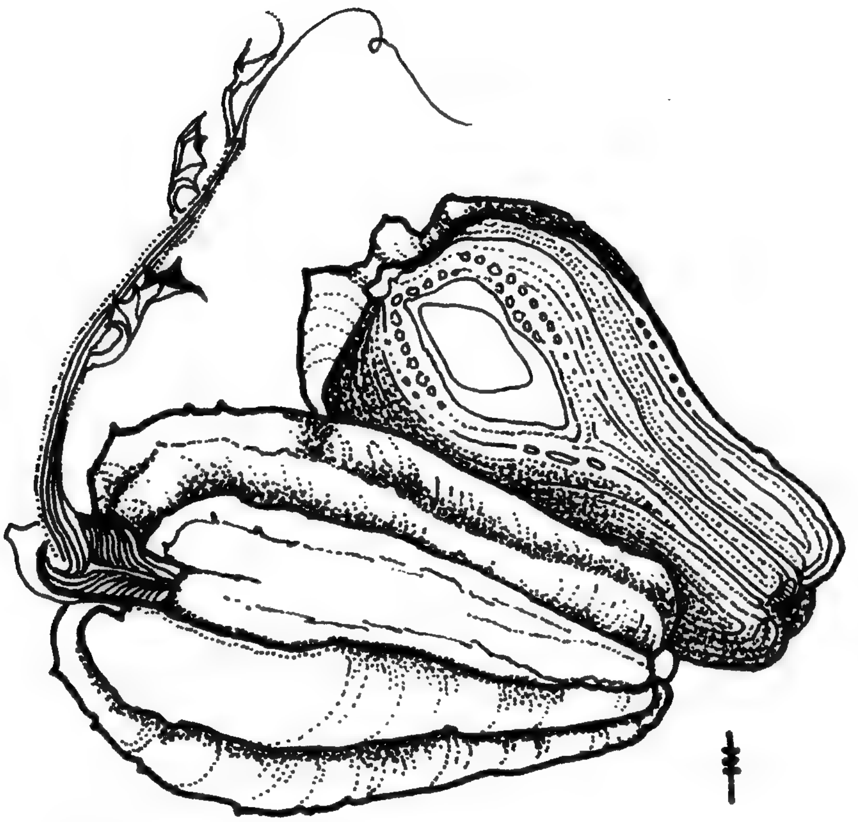
Mulch the tuber when the vines die back. Choko does best in well-drained soil. A single vine will yield 50-100 fruit, weighing up to 1 kg each, though they are more tasty if picked when younger (say 8 oz). At two years, small tubers are produced near the main tuber and may be dug for eating. Fruits store for several weeks.

Preparation: The young leaves and the growing tips of the vines may be used in salads or cooked as a green like spinach. The tuberous root is said to taste like sweet potatoes or yams and must be boiled or roasted. Treat choko as a delicate squash or marrow when cooking in a variety of recipes, in soups, sauces, salads, chutney, creamed, baked, or as 'chips'.

Seeds: Obtain a healthy looking fruit (or two) from your gardening neighbour, supermarket or friendly greengrocer and away you go! Choko rates at 0.9% protein, 0.2% fat and 7.7% carbohydrate and is high in vitamin A.

Choko chips or fritters.

Boil choko until tender, cut into slices or chips, dip in a batter of beaten egg and breadcrumbs and fry until brown.



GROWING CHOKO AROUND PERTH

BY Wilma & Jim Dachtler

From an investment of 20 cents in a choko three years ago we have produced well over 100 chokoes each year.

For versatility, the choko must rate highly. It can be baked, boiled, pickled, used in jam and served as a dessert. It has a fairly bland taste and is adaptable to many ways of cooking.

In Western Australia (Perth area) choko does not produce its crop until late autumn, around the end of April, but will usually then produce for three months. This comes as a welcome change to the self-sufficient gardener as the summer crops have finished and it is a little early for most of the winter crops.

Some leaves can become scorched during the heatwave conditions that prevail from time-to-time and new shoots are burnt by hot, drying winds during summer, but a fine water spray usually keeps the vine free from heat stress.

It is advisable to have two or three plants — then you won't lose your entire crop for a season if disaster should strike one of your vines for some reason.

To grow a choko vine just let it sprout. A shoot will appear in the centre of the choko. When this is about 20 cm, plant the choko in rich soil, with just the shoot exposed, water well and mulch. Choko vines are gross feeders and need a good supply of water. They prefer a neutral soil, but will grow between the pH range of 6-8. They are reasonably free from disease.

In late winter, the vine sometimes dies back with frost, but if kept well mulched and the dead sections removed, the plants should shoot as soon as the soil warms up.

The fruit should be picked before they are too large and before their soft spines have become hard.

RECIPES

Basic boiled choko

Peel under running water, halve and remove seed. Add to boiling salted water, cook about 15 minutes or until tender.

Baked choko

Peel and cut in half, remove seed. Place in baking dish with other roast vegetables.

Choko with ginger (dessert)

4-5 young chokoes
1 teaspoon grated lemon rind
2 tablespoons lemon juice
1 cup sugar
3 whole cloves
1 teaspoon ground ginger

Peel chokoes, cut in quarters and remove seed. Cut into 7 mm slices. Place in ovenproof dish, add lemon rind and juice, sugar, water, cloves and ground ginger.

Cook (covered) in moderately slow oven one hour, or until chokoes are tender. Allow to cool, remove cloves and refrigerate until cold. Serve with ice cream.

Pickled chokoes

8 chokoes
3 red chillies
1.2 litres of white vinegar
25 mm piece of cinnamon stick
2 teaspoons salt
6 whole peppercorns
4 whole cloves
2 bay leaves

Peel chokoes, quarter and remove seed. Cook in boiling, salted water until almost tender, drain, cut chillies, cinnamon, sugar, salt, peppercorns, cloves and bay leaves into saucepan. Bring to boil, boil three minutes. Place drained chokoes into jars and arrange a few pieces of chilli in each jar. Cover with strained spiced vinegar, seal immediately.

Peas for the pot

HOPPIN' JOHN

1 cup dried black-eye "peas"
¼ lb smoked bacon, or salt pork, diced
1 hot red pepper
3 cups cooked rice
black pepper and salt to taste

This is the traditional black-eye pea recipe from Florida and the southern states of the United States. You can use cowpeas, asparagus bean or pigeon peas.

Soak peas overnight. Drain, change water and cook with bacon or pork and red pepper until peas are tender. Add rice, salt and pepper. Pour into casserole dish, cover and bake in oven preheated to 350°F until liquid is absorbed and the dish is heated through. Hoppin' John is usually served hot with fried chicken or pork chops with cornbread.

FALAFEL

½ lb dried chick-peas
2 beaten eggs
2 tablespoons melted butter
2 tablespoons breadcrumbs
2 tablespoons lemon juice
salt and pepper to taste
oil for frying

Soak chick-peas overnight, then boil with salt until tender. Drain, then grind or mash them. Add the other ingredients and mix well (or use a blender). Chill and then make into small round balls or flat patties and fry until golden brown.

HOMMOUS

½ lb chick-peas soaked overnight
1 cup tahini (sesame paste)
1 cup water
½ cup oil
3 tablespoons lemon juice
1 or 2 crushed garlic cloves

Cook chick-peas with plenty of salt until tender. Strain and then grind, mash or sieve to a fine puree. Stir in tahini, water, oil, lemon juice and garlic, until the mixture looks like thick mayonnaise (or again, use a blender). Stir in chopped mint and cool. A great spread for eating with falafel, Arab bread, spicy sausage and barbeques.

LENTIL DHAL

1 cup red lentils
1 finely chopped onion
1 clove crushed garlic
½ teaspoon tumeric
3 cups water
salt to taste
2 tablespoons ghee or oil
pinch of cayenne pepper (optional)

Wash lentils thoroughly. Fry the onions and garlic in ghee or oil until golden. Add drained lentils and stir and fry for 1-2 minutes. Add water, cover and cook gently for about 30 minutes until the lentils are tender. The result is a porridge-like mixture which goes well with boiled rice and curry or as a side dish.

PERRY OF PESON

Take peson and seeth hem saft and couer hem til thei berst. Thenne take up hem and cole hem thrugh a cloth. Take onyons and mynce hem and seeth hem in the same sew and oile therewith; cast thereto sugar salt saffron and seeth hem wel thereafter and serue hem forth.

Forme of Cury, 1390

This is an extract from the ancient vellum cookery roll which King Richard II ordered his cooks to compile and is one of several hundred old recipes which Keith collected for a forthcoming book while we were in Europe during 1979.

We have adapted it as:

PUREE OF PEAS

1 lb fresh shelled peas (or split)
½ small chopped onion
2 tablespoons oil
1 tablespoon raw sugar
sprinkle of salt
few saffron threads

Boil the shelled peas until they burst. Push peas through a sieve with a small amount of their liquid. Add a finely chopped onion, oil, sugar, salt and saffron, using an electric blender (or mortar and pestle if you really want to be authentic to the times!) Reheat gently before serving.

The result is a rich, tasty, bright green puree, with the consistency of apple sauce, which may be served with any meat, especially pork.

SUBSCRIBE NOW!

Your subscription is now due for *Earth Garden No 28* which we have added as an "extra" issue for 1980. Price is $2.25 posted.

There will be four regular quarterly issues in 1981, EG29 to EG32, which will be mailed out to subscribers in February, May, August and November. Don't miss out on this new series — fill in the order form on page 58.

Bees, trees & dreams

Warrumbungle Ranges, NSW.
By Chris & Rhonda Martin.

We live in the Warrumbungle Ranges, near Coonabarabran, New South Wales. This is not the usual area chosen by people wishing to become new settlers, but we love it, despite the bad rainfall.

About four years ago after seeing Neil Douglas on the ABC television programme *A Big Country*, all our hazy ideas coalesced and we sold our house in Sydney which we had kept as a safeguard "in case we didn't like the country". We had moved here to take a job.

We then bought 12.5 hectares of the red volcanic soil in the midst of our lovely ranges.

Most people of course thought we were quite mad and some that we were brave (which we aren't). Our parents were concerned that we had bitten off more than we could chew — being city people with no experience of country living — and would be hurt.

This is always possible, of course, and it is very difficult to make a living on 33 acres of so-so soil. But we can try to be self-supporting to quite a degree and this should save us quite a lot of money.

We have learned a lot from books and from helpful neighbours who have seen we are prepared to work. We have learned that we have muscles and we are proud of our fences, built with blood, sweat and tears — literally. Often we have worked with a copy of *Earth Garden* parked on a handy post.

Our first fence was a miracle of mis-alignment and gained us about three acres of the land next-door. He made us give it back though.

When our fruit trees started bearing last season the first fruits were stolen by scurvy knaves travelling past. The parrots exacted a fair toll and so did our cow when she got through a six-inch gap in the gate.

Our cow keeps the long grass down and provides us with a calf each year and loads of lovely manure. She has grown used to us following her around with a bucket and spade and a hopeful look. So far all manure goes around the fruit and nut trees, which are mulched with straw after harvest by bemused local farmers.

Redleaf, our cow, is not a milker. That will come when we move to our "piece of dirt". We bought her at the saleyards, a small bewildered heifer, already in calf, being harassed by men with flailing polythene pipes. This memory is still fresh to her.

At the moment we are building a mudbrick weekender which we will live in while building our "big house", using the experience painfully gained on this one. Then the weekender will become our guest house.

Rhonda's particular joys are her black sheep, rogues all and spoilt rotten. These are yarded at regular intervals by a 15-year-old Kelpie while the sheep roll their yellow eyes in wicked delight as they charge to the top of our highest hill. But in the end we win and they are drenched.

Chris is in love with his bees and we both love their honey, even the new queens were ungrateful enough to mate with a wild drone and produce progressively wilder progeny. That will be remedied *soon!*

As both our pet projects gained us firsts at the local show recently, we are well pleased.

Our biggest dream is to breed and train Clydesdale heavy horses to harness, but for that we need more land and money. But for now it is our mudbrick house, our vegetables and fruit and nuts, our sheep and bees and replacing the trees stripped from our land many years ago.

Our orchard

Our climate here in the Warrumbungles is varied, with winter temperatures sometimes falling to —10°C and summer temperatures in the high 30's for days on end. Because of this we have chosen as many varieties of each kind of fruit as possible, so that some at least crop well each year.

We chose the orchard area and fenced it with a sturdy rabbit-proof fence (won't share with them) that we have found essential. Rabbit netting is very expensive, but we bought ours second-hand by asking around or buying at sales.

We decided not to cultivate between trees, which is the recommendation in most books, but instead follow Michael Roads' *no-dig* method for these reasons:

1. Cultivation disturbs the natural balance of the soil.
2. Soil washes away on slopes.
3. Cultivated soil is wide open for soil infestation.
4. Cultivation wastes precious energy resources.
5. When the trees are big enough we intend letting our sheep graze the area. In the meantime we mow twice a year by hand, letting the cuttings rot back into the soil.
6. There is better water retention by keeping a grass cover.
7. Mulching regularly with straw and manure to the dripline gets over the dislike some trees have, eg pears and apples, for grass.

Initial ground preparation is most important. Digging a small hole with a posthole digger and popping in the tree is not good enough. The soil should be loosened for at least .7m around the trees, or else the root system will ball up and not spread properly.

Our soil was so poor we used a small quantity of *Nature's Own* mineral fertilizer when the trees were planted.

Even though the trees have only been in for 18 months we have already had some fruit from the peaches, apricots, grapefruit, mandarins, lemons and a few nuts from the almonds. The peach crop was so heavy we had to thin them out for fear of harming their growth.

Citrus trees can be grown in frost-prone areas if they are protected during the winter until they grow above the frost line. We use old bags to cover them.

Our district has very heavy fruit fly infestation, but when we put out *Dak Pots* we caught only one male fly and no grubs were found in the fruit.

We have sprayed with garlic and grow garlic and marigolds around the trees and intend making use of other companion plants. There have been some insect attacks as we do not believe in using pesticides. We have a bountiful supply of birds to eat the insects because we are close to Warrumbungle National Park. The Eastern and Crimson Rosellas have had their fair share (and more) of our fruit, so we will get mist nets for next year's crops.

Our trees really look healthy now and even the curly leaf of the first year's growth has not reappeared. During last spring a thick thatch of clover grew like mad through the orchard. When we let the sheep in, to give them a treat, they ignored the clover and headed for the trees, especially the hazelnuts, so out they went.

Bees are important pollination agents, so we have a hive near the orchard. When the trees are big enough to provide decent shade the behhives will be *in* it. Even if you don't want to go into beekeeping, you should consider buying a hive and let someone else manage it in return for the honey. There is always the risk, of course, that these little creatures will charm you completely, as they do us.

In a "too-much-or-too little" climate like ours, proper watering is important. In this dry summer we are spending a great deal of time watering with a hand-held hose. We intend installing a trickle irrigation system as soon as we can afford it, preferably before next summer. So far we have worked hard to put a water system into this orchard to save filling a small tank at the dam and carting it in. Trickle irrigation will be the cream on the cake.

Your local nursery would be the best bet for finding out the best varieties for your area, but don't be afraid to experiment. We are trying macadamia nuts and, frosts and hungry cows apart, they are still growing. The cheapest way to buy fruit trees is open ground, but most nurseries recommend that citrus trees be purchased as "advanced" in pots, as they are fickle when young.

Apart from *Earth Garden,* we have found Michael Roads' *Organic Gardening in Australia* and Kilpatrick's *Pruning for the Australian Gardener* very helpful (the latter of course only if you believe in pruning).

We are currently growing 22 types of fruit trees, vines and nuts and hope to experiment with more as we gain confidence and experience — with regular helpings of Neil Douglas.

Reviews

Australia and New Zealand Organic Gardening

Peter Bennett, Australia & New Zealand Book Co, Sydney, 1979, large paperback, 183 pages, illustrated, $9.95.

Peter Bennett is one of Australia's best known publicists of organic methods and mineral fertilisers, particularly in South Australia through his column in *The Sunday Mail* and his 5AD radio talkback programme.

It is a timely book, well researched and thoroughly grounded in horticultural science, and comes just when many people are turning to non-chemical or organic gardening and farming and its philosophy.

"Organic gardening", says Peter Bennett, "is a collection of skills, tempered with experience and observation, which can maintain a stable life support system and produce vegetation of high nutritional value upon which Man may depend for a vigorous and healthy life-cycle . . . organic gardening embraces only sound ecological principles of soil husbandry, biological (rather than chemical) control of insects, predators, management of habitat, the avoidance of conventional chemical fertilisers and the minimal use of non-poisonous insecticides."

As might be expected from somebody whose boyhood hobby was studying insects (see *Earth Garden No 3,* page 49), the identification of predatory friends and pestilent foes of the insect world is well covered with a series of clear photos and drawings to make them recognisable. This applies also to birds and animals.

The photos of organic gardening techniques and the vegetables produced stand as a good recommendation for the methods outlined. You can see with your own eyes healthy tucker that can be obtained from composting, mulching, and using biological controls, adding mineral fertilisers like limestone or dolomite.

There are culture notes on individual vegetables and their requirements, suggestions for turning a lawn into a garden and ways of incorporating eucalyptus leaves, bark and twigs into compost adding *Eokomit* bacterial culture, which, as Peter says "dispells the nonsense about gum leaves making poor compost". He grew strong tomato plants in this compost too.

Our copy supplied by A.N.Z. Book Co.

HONEY LOCUST SEEDS

At Wytaliba Community, Old Grafton Road, Glen Innes, NSW 2370, we have honey locust *(Gleditsia triacanthos)*which we want to market. Any ideas?

I HAD NO SAY

A Guide to Natural Living for Parents and Children.

Sister Joyce Lubke, Bringelly, NSW 2171, 1980, paperback, 111 pages, illustrated. Price $5.95.

Sister Joyce Lubke has been a nurse, a mother, and for the past 17 years a practising naturopath specialising in the upbringing and diet of children. She is more than qualified to write this book.

She covers a broad scope here, beginning with preparation for parenthood and natural family planning (with a horrifying list of possible side effects of the "pill") and continues through care of mother and baby (before and after birth) and raising the children until they are teenagers

Obviously these topics are not treated in great depth, but the practical, no-nonsense approach and heavy emphasis on a natural diet make this a handy manual for every family.

Sister Lubke handles it all in a refreshing, down-to-earth, no-punches-pulled style, drawing on her years of practical experience.

Woman controlled contraception

A self-help group for women who want to prevent or control contraception by natural methods is meeting weekly at Leichhardt Women's Community Health Centre, 164 Flood Street, Leichhardt. Phone 560 3011 for further information.

Birth of a midwife

BY MAGGIE LECKY-THOMPSON

I first became interested in homebirth two years ago when I read *The Birth Book* by Raven Lang. A description of homebirths in California, it whetted my appetite for more, so when a friend suggested that we go to hear a lecture by an American "lay" midwife, I leaped at the chance.

There I met Ina May Gaskin and it was a mind blowing experience — those of you who have met her and Stephen will understand. I sat spell-bound and just absorbed, like a sponge, her wisdom, her spiritualism and her far-sightedness.

Ina May reached out and touched a special nerve for me: I walked out of that lovely, grotty old Town Hall at Paddington (Sydney) and knew that my life would never again be the same. Ina May must have known it too. She ran three blocks to give me her last copy of *Spiritual Midwifery* and her — "I know you're going to need this" — still keeps us writing and sharing.

At first it gave me the impetus and purpose to go ahead and have my third baby (as yet unconceived) at home. My daughters were born in hospital, nullifying, non-growth experiences that were in themselves horrific.

Thank goodness I breast-fed them for a reasonable period, it was a ladder to regain my self-esteem. But until I met Ina May, the thought of a repeat performance of that humiliation and sense of inadequacy held my desire for a third baby quite dormant. Yet the day I conceived my homebirth baby, there was lovely Virginia (a friend) four months pregnant and Ina May was talking to us via videotape and I knew Virginia would ask me to help at her homebirthing.

Strange how easy it was to accept. I had five months to either find someone more experienced in homebirth than myself or drum up as much knowledge and experience in home midwifery as possible.

Before Virginia's baby arrived, lots of things came together. Parents' Centre Australia launched its Home-Birth Referral service, a group of us began to meet regularly and I found another midwife. Chris had just finished her midwidery training. We got together on my first two deliveries and she was great for me. Lovely and open, receptive to the idea that all mothers know what's best for them and their babies, yet concerned that their nursing care be as professional and caring as possible.

We giggled nervously at our lack of experience, always undecided whether we should be totally frank and warn the parents/clients/patients of our ignorance, or bluff because "after all we must be better than no-one or someone with *no* training" — that was our constant reassurance.

We gave each other the sense of teamwork and sharing of responsibility that we'd always taken so much for granted in hospitals, knowing the period we could work together was limited. Chris is single and has the wanderlust. Every so often she comes to Sydney and it still feels good to share our levels of growth. It's a rare lady who is so "tantric", as Ina May would put it "without having given birth herself".

The demand for responsible midwifery began to grow and the support group gathered strength and direction, so we started to advertise for midwives.

Groups never take shape as you visualise they will. We thought that with a core of midwives we'd be able to cover various areas of need around Sydney, or even New South Wales. Unfortunately, the few midwives who answered our ads either needed permanent employment (which we did not feel able to guarantee), or simply lacked confidence. As a group we wanted the best of all domiciliary services. We needed midwives who considered themselves individual practicioners and were able to establish vital links with doctors, yet were confident enough of their status to accompany their ladies to hospital if the need arose.

I am lecturing regularly to medical students and some general trainee nurses, a task I enjoy almost as much as pure midwifery. I'm quite sure I have the best job in the world, with three beautiful babies of my own, my husband to match, and the privilege of being invited to participate in these enriching family events.

Who wouldn't want to be a midwife?

The Sydney Homebirth Group: Contact Carolyn Spruell, 9 Bromsborough Road, Roseville. Phone: 46 4307.

Support meetings, Sundays 2 pm, June 22, Saturday, August 2 conference, September 14, October 20 and November 30.

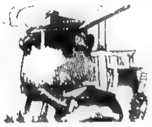
Maggie holding one of her home-delivered babies, Owen, the son of our artist Elaine Norling.

THE RURAL STORE

Lowndes Road, Kilmore, Victoria, 3601.

The Rural Store is a mail order specialist in both books and equipment covering rural self-sufficiency in general and bread-making, butchering, sausage and cheesemaking in particular. Very good on books about livestock, especially horses, pigs and poultry. They supply flour mills, bread-baking tins, yeast, glass butter churns, butchering knives, boners, saws, cleavers, skewers, mincers and pickling and brewing gear.

We suggest you send 30c in stamps for their catalogue.



NSW College of Osteopathic and Natural Therapies

3rd floor, Alderson Building, 504 Pacific Highway, St Leonards (Sydney), NSW 2065. Phone 439 7375.

The College offers Diplomas, spread over 3-4 years of study in Osteopathy, Naturopathy, Botanic Medicine and Oriental Medicine. You may also obtain a certificate from part-time study.

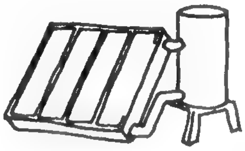
If you are keen on a career in the natural therapies including acupuncture, chiropractics, herbalism, homeopathy, naturopathy, nutrition or osteopathy, phone or write for further details. You may start at the beginning of any term of the academic year.

Part-time courses starting in June and September this year include Herbal medicine conducted by Dennis Stewart and Nutrition, co-ordinated by Xandria Williams.

Going Solar

438 Queen Street, Melbourne, Victoria 3000.

Going Solar has taken all its alternative energy hardware from 375 to 438 Queen Street. We understand a mail order catalogue is available for 2 x 22c stamps, but our efforts to obtain one have been unsuccessful so far.



Alternatives

37 Bangalla Street, Torwood, (Brisbane) Qld 4066

Alternatives is a kind of Aladdin's Cave of renewable energy delights all housed in a neat building at Torwood (near Milton) which you can spot by the bicycle wheel wind generator and orange solar water heater on the rooftop.

There you can see and buy pot belly stoves, combustion cookers and heaters, herb seeds and potted plants. Aladdin kerosene lamps and spare parts (including mantles), seaweed fertilisers, pyrethrum, solar cells, Retsel, Spong, Corona and Samap grain grinders, organic food, tofu, small water filters, a solar reflector barbecue, Trojan earth block machine and a bicycle frame for pedal power grinder (costs $49.00). Nice people. Good ecologically-sound stock.

Trevor Birrell may be contacted at Alternatives for consultation on solar and wind power for city and country homes. He built the bike wheel electric generator.

Alternative Technology Co-Operative

366 Smith Street, Collingwood, Victoria 3066.

Membership $10.00 (students and unemployed $5.00).

The Alternative Energy Co-Op has been reborn following the success of the Sunday Energy Fair in Melbourne on March 30. The Co-Op holds regular meetings with guest speakers, has a newsletter and is planning a small magazine. Some of the members have built solar water heater panels, or own solar cells and some are interested in wind energy.

Books

The Lexicon Firm bookshop and book mail order service (Access 1, EG22-3, page 132) has closed down. It will be missed.

BLACK SHEEP & FLEECES

We breed healthy, content, black and coloured sheep on a small acreage 20km from Bathurst, NSW. They are not your normal run-of-the Mill Cottage sheep — these are family. They all have names, coats, collars and unique personalities. They have been trained like Pavlov's dogs, to come to the sound of the bell (bell=oats) and are used to being tethered in the garden.

If you are interested in buying ewes, wethers or a randy ram and having good quality crossbred (Border Leicester X Dorset Horn X Merino) woollen jumpers, then please contact us. All applicants carefully screened for humanitarian sheep handling techniques and good disposition. Fleeces for sale too.

Robinson Family, "Mill Cottage", O'Connell, NSW, 2795. Phone: (063) 37 5755.

COLOURED FLEECES

Whole fleeces from coloured Merinos for home spinning for sale at $1.00 per lb (we don't have a metric scale) plus freight.

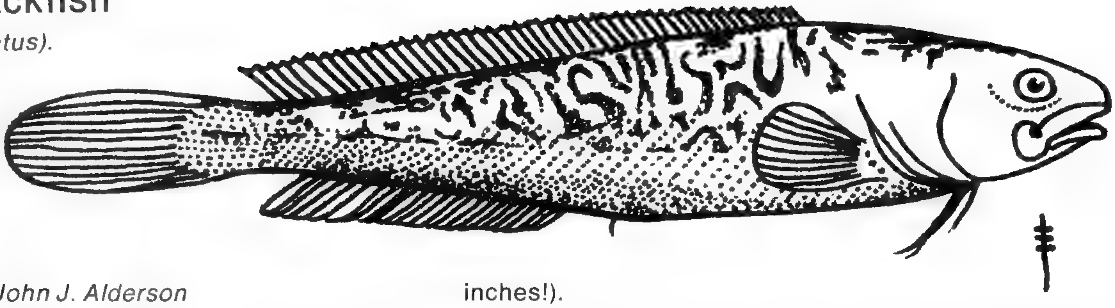
June Trousse, PO Box 35, Dawesley, SA, 5252.

SHEEP

The Black and Coloured Sheep Breeders' Association of Australia, Annual subscription $15.00, payable on January 1 each year to The Secretary, PO Box 368, Frankston, Victoria, 3199, quarterly newsletter, show sales, field days and workshops. Publishes a flock register with details of sheep and wool types. Other coloured sheep breeders' groups were listed in *Access 2* (EG25), page 177.

The River Blackfish

(Gadopsis mammoratus).



By John J. Alderson

I searched carefully through the aquaculture section of *Access 2* (EG25) for any mention of my favourite fish, the native blackfish.

Alas, there was none. So, from my scant knowledge I hope to remedy that lack.

There are two blackfish, the river blackfish (*Gadopsis marmoratus*) and the Tasmanian blackfish (*Gadopsis tasmanicus*). The latter occurs in Tasmania and has some vague differences to the mainland species, more with the number of fin rays in the caudal fin and pectoral fins than in their habits and usefulness.

My acquaintance is with the mainland variety. To the eye of an artist like myself there seems to be two types here in Victoria; one dark-to-blackish, with lighter circles and a beautiful golden type with darker circles. This may be a colour variation, or may simply be due to a chameleon-like ability to change colour according to the surroundings.

If, however, it is a true colour variety (we found it in King Parrot Creek by the way), then there may be scope for breeding this variety for ornamental ponds. It is beautiful — if not as spectacular as the tropical goldfish.

The blackfish is a fresh water species, but apparently has a high tolerance for salt, being found occasionally in the estuaries of tidal rivers. Its preference is for streams with gravel bottoms and lots of snags, which probably help in the breeding season.

It does actually prefer hollow logs for depositing the eggs, though usually they are deposited on the gravel stream beds.

Its natural range extends from the Torrens River in South Australia eastwards through Victoria and as far north as the Condamine River in southern Queensland.

It occurs in the upper Murray, but I have not heard of it in the lower Murray and certainly I've never caught one — but then, I seldom brag about my fishing.

Blackfish will flourish and breed in dams. Many of the old dams in the central area of Victoria are stocked with blackfish, or were, until redfin and perch were introduced. They were a lot more common at the beginning of the century than at present, even in streams.

They are carnivorous, eating water insects and occasionally other fish. Usually bottom feeders, they will eat anywhere they find the feed, or anything that falls in the water. Diet varies according to the locality and changes with age. The older the fish, the more land bugs it will eat. Being nocturnal, they are best fished for in the evening or morning.

They spawn in late spring and early summer. The mechanism regulating this is unknown, but they still breed successfully in streams and dams. They are somewhat slow in growth, becoming mature in their third or fourth year, when they reach a length of over 150 mm (in old fashioned measures, that's a lousy six inches!).

A ¼ kg fish produces only about 500 eggs, but the survival rate is higher than with other fish. The eggs are adhesive and deposited on the bottom of the dam or stream. They are as large as trout eggs.

Growth rates break no records. A year-old fish will be about 40mm in length and a second year fish 120 mm. Fish up to 600 mm in length and of 5½ kg weight have been caught. In recent years fish of half this weight have been caught. Their ages were unknown and the lifespan of the blackfish also seems unknown.

In 1978, I went out on a field trip with Peter Jackson of the Fisheries and Wildlife Division of the Arthur Rylah Institute for Environmental Research. He was doing research into blackfish breeding habits and since that time may have published something on the subject.

We fished in King Parrot Creek with an electric shocking device (which are illegal for ordinary mortals). In a stretch of creek perhaps 40 metres long and five metres wide and of wading depth we caught something like 80 fish (and one yabbie). We measured them, noting their breeding condition, then throwing them back. That was the hard part. That too, was when we discovered what beautiful fish they are.

Blackfish make good eating and require no scaling. There is no commercial hatchery breeding them and the only way of getting them is to transfer them from streams or stocked dams. It is best to take only the tiny fish as they have the best chance of survival.

It is best to chill the water if taking the fish far. Gradually bring the water back to dam temperature by pouring dam water into it slowly. After the fish have got over this shock, in say, 10 minutes or so, pour the contents of the container into the dam. This applies to moving all fish.

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more land lines

Do you live in a NSW rural commune?

A message to NSW rural alternative communities from the Sydney University School of Architecture. Many urban dwellers dream about an alternative. Information can turn hopes into plans. Would your community be willing to contribute information to our study of the range of rural alternatives existing in NSW?

A questionnaire has been sent to every NSW community whose address we have, as well as to meeting places. If your community has not received a questionnaire and you would be willing to complete one, please contact Margaret Munro-Clark or Helen Simmons, I. B. Fell research Project on Housing, Department of Architecture, GO4, University of Sydney, NSW, 2006. Phone: (02) 692 3471. The name and address of your community will not be published unless we have your express permission to do so.

Woman and young child are looking for a home and hope someone can find room for us. We would like to share land with a small group of people, or a community, especially with other children. Interests are alternative education, gardening, craft work. We would prefer a place that is quiet, green and fairly isolated, especially from large towns.

Hope to hear from someone soon. Love, B. Freeman, C/- 3 Waranga Street, North Dandenong, Victoria, 3175.

We live on King Island in Bass Strait and reluctantly must part with our five acres at Naracoopa on the eastern coast. There is forest on one side and a spectacular view over Sea Elephant Bay and Councellor Island. There are good fences, two paddocks, dam, organic vegetable garden and a pine cabin with sleeping loft nearing completion.

The island has sheep, beef, dairying, kelp harvesting and scheelite mining with varied work frequently available at the mine. There are rugged reefs, long sandy beaches, crayfish and abalone in good supply. There are shops, hospital, four primary schools and we are 55 minutes from Melbourne by air, closer to mainland Tasmania.

Please write to Col & Liisa Anderson, C/- PO Grassy, King Island, Tasmania, 7256.

Terania Creek: There are two shares available in a co-operative in Terania Creek, 18 miles from Lismore. At present there are nine other shareholders on 228 acres. Property, in a beautiful valley, is undulating, mostly timbered with a number of creeks and 60 acres suitable for grazing. Zoned for hamlet development. Cost of shares is around $3500.

Please write to Peter Saulwick, The Channon, NSW, 2480. Phone: (066) 88 6277.

We are looking for someone who likes country living, small animals, goats and poultry, who is interested in organic gardening and doesn't mind hard work when a helping hand is needed, to share with us in exchange for food and full board, vegetarian or meat meals. Perhaps you can come for a working holiday — our winters are mild here in Central Queensland. We are building our own home and have established gardens and animals for meat and eggs. No dogs please.

Write: Yvonne Braun, C/- Calliope, Qld, 4680.

We are a family of five — Dick 31, Sally 37, Leon 7, Ellenor 6 and one pussycat.

We are seeking self-sufficient people who may have some land to sell or share. All we have is a 22 ft caravan, but we are prepared to sell, trade or exchange it for a piece of dirt. We are most anxious to start or join a community aimed at self-support. We eagerly await replies.

Please contact Dick Piasecki, C/- Tweed Heads Caravan Park, 112 Dry Dock Road, Tweed Heads South, NSW, 2413.

We are seeking a couple or group of interested people to live on our large western Queensland sheep property. We offer two homes, a 12 bedroom shearer's quarters and the use of all machinery and facilities and adequate land to people with a pioneering spirit and respect for nature and the environment.

Settlers can have free land to do what they want in return for caretaking the property on a permanent basis, or we would consider shares. There is a 7 km river frontage, telephone and a large town within 40 miles.

Anyone interested should contact Peter Kirby, PO Box 385, Dalby, Qld, 4405.

I am forced to sell my four-fifths share in a 40 acre block of land near Goulburn, about three hours drive from Sydney. The land is close to the Wollondilly River, well drained, with grazing land and rugged scrub, including small caves and a rocky pinnacle which overlooks the valley.

There is no water at present but a dam site has been approved by the Soil Conservation Service. A Sydney painter is the owner of the remaining fifth share and is currently building a shelter for his family. Asking $11,000

Bruce Russell, 25 Glebe Street, Glebe, NSW 2037. Phone: 660 6017.

Due to ill-health and being fed up with the city, we are looking for a place where we can live off the land self-sufficiently in exchange for work. We are young Christians, Ric (25) and Sue (22). We don't agree with the drug and immoral practices of today. We would prefer a place in South Australia or Tasmania, but this is not essential.

Our address: Ric and Sue Edwards, Flat 2/33 Hopetoun Avenue, Kilburn, SA, 5084.

Would there be a person, small group or family, who require an extra helping hand in any of their projects in exchange for accommodation, anywhere in south east Queensland as far as Gympie area. I am particularly interested in organic gardening and wish to be in a peaceful environment. I'm not into drugs or alcohol and I'm 28 years old. I'd be glad to hear from you if you'd like a hand, even for a short time.

Contact: David Hayden, Box 490, PO Toowong, Qld, 4066.

We are a family of five (ages 3-33) living on 40 acres near Gembrook State Forest, wanting to meet fun-loving, hard-working, sensitive people with kids, to share with us and our land, or theirs. We like living simply, we are working towards becoming self-sufficient and want to avoid the traditional education system. We are vegetarians and not into drugs or any established spiritual path.

Annette and Geoff Hain, Olsen Road, Nar Nar Goon North, Victoria, 3812.

Wanted: Land in south-west Western Australia, virgin or limited development. Must have fresh water, undulating preferred. There are four of us, 13, 15, 41 and 38. Our aims are to develop self-sufficiency, organic growing and preservation on an individual or co-operative basis, or maybe join an existing commune.

Phil, Veryl, Lyn and Darryl Brock, Box 93, Esperance, WA, 6450.

Judy (38) and Dan (2½) need caring people to live with or near and a place, preferably in a warm climate. Our ideal is a sort of "extended family", with other children and older and younger people. We could share a house or live nearby. We are ready to move anytime. I enjoy gardening or farming and have some experience. I can contribute energy and money. I'd like to hear from established families or groups, also from others seeking a similar way of life.

Judy Roseth, 5 Boyce Street, Glebe, NSW, 2037.

Dear friends,

The cheapest way to obtain food is to grow it yourself.

In the present atmosphere of inflation and rising food prices more and more people are being drawn to the practical benefits of growing at least some of their own food on whatever land they have available.

It makes sense on so many levels. You are eating real food that is fresh and nutritious; growing food on a small scale conserves water and saves our dwindling fossil fuels; organic, ecological methods of growing renew the precious top-soil which supports mankind.

In this new series of *Earth Garden* issues we are setting out to show that you can achieve a balanced diet from the food plants grown on a small plot of land.

From our first issue onwards we have dealt with the basics of organic growing, composting, mulching and other techniques. Starting with this issue we will be compiling a series of plant profiles which we hope will open up a diversity of new foods which will add up to a useful resource for the future.

The first third of Len Muller's series of tropical food plants for Australia starts on page 27. The second part (D-P) will take in plants like devil's fig, durian, five-corner, ginger, guada or New Guinea "bean", jakfruit, lemon grass, mangosteen, naranjilla, pawpaw and pineapple and will appear in EG28, with the final segment in EG29.

We have been researching legumes — peas and beans — from all climates from the point of view of their protein alternative to meat and have assembled information on 16 types in the stories starting on page 35.

There will be more stories on all sorts of edible and economic plants and we are looking for any feedback or contributions which will help us with this task. The amount of food plants in the world is vast and our knowledge so limited that we are only scratching the surface.

As for tropical fruit trees, leafy greens, spices, herbs and vegetables — well, we've made a start!

Earth Garden 28 will also contain stories on cool and temperate climate food plants. Other articles in hand include more on timber felling, making cider, Merino sheep, and beekeeping, plus access, land lines and seed swaps (a free listing).

We have settled in now and can see our way clear to promise you regular quarterly issues once again. This will begin with EG28, out in November. Then in 1981 there will be EG29 in February, EG30 in May, EG31 in August and EG32 in November.

We are determined to keep our cover price at $2.00 during this period, despite inflation and price rises in paper, typesetting and printing rates which we know are inevitable. But postage is expected to rise again next year and this is an increase we will *not* be able to absorb. We will have to pass it on *then*, so you will save money if you subscribe *now*. The five issues from EG28 to EG32 will cost a total of $11.25 posted.

The reason for the gap between this number and EG28 is to give Keith time to complete some long-term projects, especially his vegetable growing and cookery book along similar lines to *The EG Herbal*. More news of these at a later date.

Times change. The view through our window is grey and gloomy as winter begins. This time last year we were camped for a few days in the sun on a beach in the Gulf of Corinth and celebrated Melissa's birthday there. A jar full of that Grecian sunshine would certainly brighten up the room now!

But we are warmed up by your welcome home messages and all the letters we've had telling us you are happy to see Earth Garden back in print.

Peace and love,
Irene and Keith

EARTH GARDEN, PO Box 378, Epping, NSW, Australia, 2121

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EG5: WIND ISSUE — WINDMILLS ... WINDPUMPS ... GENERATORS ... RAKU ... CINVA-RAM ... TOOLS ... POULTRY ... THE VEGAN WAY ... MOON PLANTING ... JUST NINE ACRES.

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EG8: GAS POWER — METHANE DIGESTER ... POWER FROM THE PIG PEN ... BY TRUCK TO TASSIE ... ¾ ACRE ... CUMBUNGI HATS ... HARMONY FARM ... TAPERS ... INKLE LOOM ... COTTAGES ... A-FRAME.

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EG11: WATER ISSUE — HYDRAULIC RAM ... WATER WHEELS ... A MILLER'S TALE ... SEED PRIMER ... HEAVY HORSES ... OKRA ... TOMATOES ... START WITH HENS ... WINE ... HARD CHEESE.

EG12: KEEPING FOOD — DRYING ... SALTING ... BOTTLING ... STORING ... TAHU ... TOBACCO ... PLANT PROPAGATION ... GARLIC SPRAY ... PLANS FOR A SOLAR WATER HEATER (PART 1) ... SOLAR STILL ... SOLAR COOKER.

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EG14: SELF-SUFFICIENCY — GARDENS FOR ALL ... BOTOBOLAR GRAPES ... ABIGAIL'S GOATS ... MILLET ... CRUSOE ... THOREAU ... HELEN AND SCOTT NEARING ... WE BUILT IN STONE ... HEALTHY SOIL.

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